



Statement of Basis

EPA's Objection to Title V Air Quality Permit

Otter Tail Power Company – Big Stone I and II

Big Stone City, South Dakota

South Dakota Department of Environment and Natural Resources

Draft

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1.0 Background

On November 20, 2008, the Board of Minerals and Environment ordered DENR to submit a proposed Title V air quality permit for Otter Tail Power Company's Big Stone I facility. The proposed Title V air quality permit is for the continued operation of the Big Stone I facility and contained enforceable permit conditions that allowed Otter Tail Power Company's proposed Big Stone II facility to forgo a Prevention of Significant Deterioration (PSD) air quality permit for sulfur dioxide and nitrogen oxide. In addition, the proposed Title V air quality permit contained enforceable permit conditions that allowed Otter Tail Power Company's proposed Big Stone II facility to forgo a Case-by-Case Maximum Achievable Control Technology (MACT) review.

DENR submitted the proposed Title V air quality permit to EPA for EPA's 45-day review period which ended January 22, 2009. On January 22, 2009, DENR received EPA's objections to the Title V air quality permit. In accordance with 40 CFR § 70.8(c)(1) and (4), and the Administrative Rules of South Dakota (ARSD) §§ 74:36:05:21 and 74:36:05:21.01, if EPA objects in writing to the issuance of a permit within the required timeframe, DENR may not issue the permit and must respond to the objection within 90 days after the date of an objection by EPA.

2.0 EPA's Objections

As stated above, DENR received EPA's objection to Otter Tail Power Company's proposed Title V air quality permit for its Big Stone operations on January 22, 2008. The objections did not pertain to the continued operation of Big Stone I but to the enforceable conditions that DENR placed in the Title V air quality permit to allow Otter Tail Power Company's proposed Big Stone II facility to forgo a PSD air quality permit for sulfur dioxide and nitrogen oxide and a Case-by-Case MACT review.

In accordance with 40 CFR § 70.8(c)(2), EPA is required to include a statement of EPA's reason for objecting and a description of the terms and conditions that the permit must include to respond to the objections. EPA has the following three objections: 1) failure to include applicable requirements from PSD air quality preconstruction permit and New Source Performance Standards (NSPS) in the Title V air quality permit; 2) lack of proper PSD applicability analysis for sulfur dioxide and nitrogen oxide; and 3) inadequate compliance provisions.

2.1 Failure to Include PSD Requirements

2.1-1 Request for Federal Citation

EPA argues that since the Title V air quality permit includes some of the units from the proposed Big Stone II facility that any applicable requirements associated with the Big Stone II facility are required to be included in this Title V air quality permit action. Therefore, since the Board of Minerals and Environment issued the PSD air quality permit for the proposed Big Stone II facility for particulate matter, carbon monoxide, volatile organic compounds, sulfuric acid mist, and fluoride on November 20, 2008, EPA argues DENR should have included them in the Title V air quality permit that was proposed on the same day by the same board.

EPA cites 40 CFR § 70.6(a)(1) as its justification for requiring the PSD permit requirements being placed in the Title V air quality permit. In accordance with 40 CFR § 70.6(a)(1), a Title V air quality permit shall include "Emission limitations and standards, including those operational requirements and limitations that assure compliance with all applicable requirements at the time of permit issuance." EPA also cited 40 CFR § 70.2 because it requires Title V air quality permits to include "Any term or condition of any preconstruction permits issued pursuant to regulations approved or promulgated through rulemaking under title I, including parts C or D of the Act." Title I, Part C of the Clean Air Act pertains to the PSD air quality permit. In addition, EPA cites a May 20, 1999, memo from John Seitz, Director, EPA Office of Air Quality Planning & Standards to Robert Hodanbosi and Charles Lagges of STAPPA/ALAPCO as evidence that the requirements in the PSD permit are applicable requirements and must be included in the Title V air quality permit.

DENR agrees with EPA that the requirements in the PSD air quality permit are applicable requirements under the Title V air quality permit program. However, DENR disagrees on the timing of when those requirements are required to be included in a Title V air quality permit.

In accordance with 40 CFR § 70.5(a)(1)(ii), it states "Part 70 sources required to meet the requirements under section 112(g) of the Act, or to have a permit under the preconstruction review program approved into the applicable implementation plan under part C or D of title I of the Act, shall file a complete application to obtain the part 70 permit or permit revision within 12 months after commencing operation or on or before such earlier date as the permitting authority may establish..." Title I, Part C of the Clean Air Act pertains to a PSD air quality permit.

In the preamble for 40 CFR § 70.5 (57 Fed. Reg., 32271 and 32272, July 21, 1992), EPA discusses the fact that the proposed rule identified that a source required to have a PSD air quality permit is subject to the Part 70 permit program (also referred to as the Title V air quality permit program), but did not address the timing of application submittal for these sources. EPA explains in the preamble that section 503(c) of the Clean Air Act states an application shall be submitted not later than 12 month after the date on which the source becomes subject to the Part 70 permit program. EPA goes on to explain that section 503(a) of the Clean Air Act states that any source is subject to the Part 70 permit program on the later of two dates. The two dates are the effective date of the State's approved program or when the source is subject to section 502(a)

of the Clean Air Act. Section 502(a) states that it shall be a violation for a source to operate without a permit, which EPA believes implies that a source becomes subject to the Part 70 permit program when operation commences. EPA concludes that a source may wait until 12 months after it begins operation to submit its Part 70 permit application. EPA further argues in the preamble that section 503(d) of the Clean Air Act allows a source subject to the Part 70 permit program to operate and not be in violation prior to the time it must submit an application under section 503(c). Section 503(d) is also more specific and clear that a source required to have a Title I, Part C or D permit need not submit a Part 70 permit application until after it commences operation or such earlier date as the permitting authority may establish.

In accordance with ARSD § 74:36:05:03.01, it states “A PSD or NSR source must submit a complete application for a Part 70 operating permit within 12 months after commencing operation.” DENR’s Title V air quality permit program does not establish an earlier submittal date. Therefore, an application for a Part 70 permit is required to be submitted from a source with a PSD air quality permit within 12-months after it begins operation. DENR required Otter Tail Power Company to submit its application to include the PSD requirements in the Title V air quality permit within 12 months after it begins operation (see permit condition 2.2 of Otter Tail Power Company’s PSD air quality permit #28.0803-PSD, issued November 20, 2008).

DENR believes both EPA’s and DENR’s rules are clear on the timeline for including the PSD permit requirements in the Title V (Part 70) air quality permit. DENR requested, in an email from Brian Gustafson, DENR, to Callie Videtich, EPA, dated January 23, 2009, that EPA provide the federal citation which requires the incorporation of the requirements from a PSD air quality permit in a Title V air quality permit before construction and operation begins on the Big Stone II project.

DENR is requesting that EPA revisit their objection and either provide the proper federal citation that supports this objection or withdraw it.

2.1-2 Addition of PSD Requirements

Although DENR disagrees with EPA on adding the PSD requirements, the federal rules give DENR no choice but to include the PSD requirements in the Title V air quality permit or risk the chance that EPA will deny the Title V air quality permit. Therefore, DENR is proposing the addition of the PSD requirements in the Title V air quality permit.

EPA specified that DENR must include the following conditions from the PSD air quality permit:

- Chapter 4.0 – Best Available Control Technology (BACT) limits, permit conditions 4.1 through 4.8;
- Chapter 5.0 – Other Applicable Limits, permit conditions 5.1 and 5.4 through 5.8;
- Chapter 6.0 – Performance Tests, permit conditions 6.7, 6.8, and 6.9;
- Chapter 7.0 – Fugitive Dust Controls, permit conditions 7.1 through 7.5; and
- Detailed New Source Performance Standard requirements.

In addition, DENR also included the following requirements in the PSD permit that EPA did not identify as applicable requirements:

- Permit Condition 1.1 – Construction and Operation of Source;
- Permit Condition 1.1A – Final Design Changes;
- Permit Condition 2.1 – Commence Construction;
- Permit Condition 2.2 – Submit Operating Permit Application;
- Permit Condition 2.3 – Submit Acid Rain Permit Application;
- Permit Condition 3.5 – Initial Startup Notification;
- Permit Condition 3.6 – Operational Records;
- Permit Condition 5.2 – Acid Rain Requirements for Unit #13;
- Permit Condition 5.3 – State Opacity Limit;
- Permit Condition 6.10 – Initial Certification of Continuous Emission Monitoring System;
- Permit Condition 8.1 – Continuous Emission Monitoring Systems; and
- Permit Condition 8.2 – Performance Specifications and Quality Assurance.

DENR will add additional chapters to the proposed Title V air quality permit to include the PSD requirements. These chapters will only include the PSD requirements in case EPA does not withdraw this objection. DENR will include the conditions that EPA listed in its objection along with the New Source Performance Standards and the permit conditions that DENR identified as applicable.

DENR will add a requirement in the proposed Title V air quality permit that requires Otter Tail Power Company to submit an “Operation, Maintenance, and Monitoring Plan” with the application required within 12 months after commencing operation of Unit #13 (see permit condition 13.4 in Appendix A). The permit condition identifies what is required to be included in the “Operation, Maintenance, and Monitoring Plan” and the plan must be included in the Title V air quality permit as a permit modification. In addition, DENR will specify the stack test frequency for the appropriate BACT emission limits.

EPA emphasized that the New Source Performance Standards should be detailed. DENR is unsure what EPA means by that since the New Source Performance Standards themselves are written by EPA in detail and DENR adopted the federal New Source Performance Standards by reference. Therefore, DENR believes it has satisfied the “detailed” requirement.

Although DENR disagrees with EPA’s objection, DENR included the PSD requirements in the proposed Title V air quality permit to resolve EPA’s objection.

2.1-3 Compliance with BACT Limits at All Times

EPA is also concerned that the final PSD air quality permit does not require compliance with the BACT limits at all times, including periods of startup, shutdown, and malfunctions. EPA concerns appear to be based on their reference to comments they submitted on the draft PSD air quality permit. However, EPA did not reference the transcripts of the hearing that discuss the BACT numeric limits and the best method of

demonstrating compliance during startup, shutdown and malfunctions or the Board's order. During the testimony, it was discussed that operations during startup and shutdown were too transient to conduct a performance test in accordance with EPA's approved test methods (See pages 211 through 213, and 721 of the hearing transcripts). Therefore, DENR required the development and implementation of a startup, shutdown and malfunction plan for demonstrating compliance with the BACT limits for the air pollutants that a continuous emission monitoring system was not required or not available. After considering the testimony, the Board agreed that compliance with the BACT limit during startup, shutdown, and malfunctions for units that did not use continuous emission monitoring systems was not achievable using stack testing methods and the use of the startup, shutdown and malfunction plan was an acceptable method of determining compliance with the BACT numeric limits.

Therefore, the record of the contested case hearing already resolves EPA's concern with the BACT numeric limit applying at all times, including startup, shutdown and malfunctions.

2.2 PSD Applicability Analysis

2.2-1 Unit Specific Limits

EPA claims that DENR used the operational flexibility provisions of 40 CFR § 70.6(a)(10) as the method of establishing plantwide sulfur dioxide and nitrogen oxide limits to avoid a PSD review. EPA also alleges the use of a Title V air quality permit does not allow a facility to use emission trading to avoid an applicable requirement. DENR did not express its opinion during the contested case hearing that 40 CFR § 70.6(a)(10) was used to establish the plantwide limits. DENR did, however, explain that its Title V permit program is a combined construction and operational permit program for those sources and/or source pollutants that are not required to go through a PSD review. DENR opined that it has the authority to establish those limits under the construction portion of its Title V permit program.

EPA objects to DENR using enforceable conditions and a plantwide limit on sulfur dioxide and nitrogen oxide to limit the "potential to emit" of Big Stone I and II. EPA provided DENR with three options to resolve EPA's objection which are as follows:

1. PSD netting;
2. Establish Plantwide Applicable Limits; or
3. Conduct a PSD major modification review for sulfur dioxide and nitrogen oxide.

DENR will revise the proposed Title V air quality permit to meet EPA's option for PSD netting. To resolve EPA's objection, the limits for establishing emission decreases at Big Stone I must be specific to Big Stone I, ensure actual emission decreases at least as great as the emission increases expected from the Big Stone II project, and ensure the decreases in actual emissions are enforceable as a practical matter, at and after the actual construction date of the Big Stone II project. EPA further states that the permit must also establish sulfur dioxide and nitrogen oxide emission limits that are specific to the emission units associated with the Big Stone II project and when summed together are no greater than the amount of actual emission decreases required

from Big Stone I plus the PSD significant threshold, which is 40 tons per year for both sulfur dioxide and nitrogen oxide.

As noted in the DENR's statement of basis, the base line actual emissions (based on the average emissions from calendar years 2003 and 2004) for Big Stone I was 13,278 tons of sulfur dioxide per year and 16,448 tons of nitrogen oxide per year. These actual emissions were the basis for the plantwide limit for the facility.

To resolve EPA's objection, DENR established a specific emission limit for Unit #1 and Unit #13 in permit conditions 9.2 and 9.5, which outlines how compliance with the limits is determined and added a permit condition that requires Otter Tail Power Company to calculate monthly emissions based on the continuous emissions monitoring system on Unit #1 and #13. In addition, DENR revised permit condition 5.5 and 5.9 to reflect the changes in the sulfur dioxide and nitrogen oxide limits from plantwide to unit specific.

As requested by Otter Tail Power Company, the sulfur dioxide and nitrogen oxide emissions from Unit #13 should be limited to 2,268 tons per year and 1,314 tons per year, respectively. Otter Tail Power Company proposed these limits based on Equations 2-1 and 2-2.

Equation 2-1

$$ESO2 = (56,700) \times (1 - EF)$$

Where:

- ESO2 = Sulfur dioxide emission increase from Unit #13, in tons per year;
- 56,700 = Potential uncontrolled sulfur dioxide emissions from Unit #13, in tons per year, as calculated in DENR's statement of basis; and
- EF = Efficiency (e.g. in its decimal form) of the wet flue gas desulfurization control device was assumed to be 96%.

Equation 2-2

$$ENOX = \frac{(0.05) \times (6,000) \times (8,760)}{(2,000)}$$

Where:

- ENOX = Nitrogen oxide emission increase from Unit #13, in tons per year;
- 0.05 = Nitrogen oxide emissions design rate for Unit #13, in pounds per million Btus;
- 6,000 = Nominal design rate of Unit #13 as limited in permit condition 1.1 and 13.1;
- 8,760 = Number of hours in a year that Unit #13 is allowed to operate; and
- 2,000 = A conversion factor to convert pounds to tons.

The sulfur dioxide and nitrogen oxide emissions for Unit #1 are limited to 11,005 tons per year and 15,104.3 tons per year, respectively. These limits are based on Equations 2-3 and 2-4.

Equation 2-3

$$ESO2 = (13,278) - [(Unit\#2) + (Unit\#3) + (Unit\#4) + (Unit\#13) + (Unit\#14) + (Unit\#15) + (Unit\#25) + (Unit\#33)]$$

Where:

- ESO_2 = Sulfur dioxide emissions from Unit #1, in tons per year;
- 13,278 = The original plantwide cap, in tons per year;
- Unit #2 = The annual sulfur dioxide emission limit for Unit #2 (2.94 tons per year) as calculated by Equation 2-5;
- Unit #3 = The annual sulfur dioxide emission limit for Unit #3 (1.24 tons per year) as calculated by Equation 2-7;
- Unit #4 = The annual sulfur dioxide emission limit for Unit #4 (0.14 tons per year) as calculated by Equations 2-9;
- Unit #13 = The sulfur dioxide emission limit for Unit #13 (2,268 tons per 12-month rolling period) as calculated by Equation 2-1;
- Unit #14 = The annual sulfur dioxide emission limit for Unit #14 (0.00 tons per year) as calculated by Equation 2-11;
- Unit #15 = The annual sulfur dioxide emission limit for Unit #15 (0.01 tons per year) as calculated by Equation 2-13;
- Unit #25 = The annual sulfur dioxide emission limit for Unit #25 (0.00 tons per year) as calculated by Equation 2-15; and
- Unit #33 = The annual sulfur dioxide emission limit for Unit #33 (0.00 tons per year) as calculated by Equation 2-17.

Equation 2-4

$$ENO_x = (16,448) - [(Unit\#2) + (Unit\#3) + (Unit\#4) + (Unit\#13) + (Unit\#14) + (Unit\#15) + (Unit\#25) + (Unit\#33)]$$

Where:

- ENO_x = Nitrogen oxide emissions from Unit #1, in tons per year;
- 16,448 = The original plantwide cap, in tons per year;
- Unit #2 = The annual nitrogen oxide emission limit for Unit #2 (8.93 tons per year) as calculated by Equation 2-6;
- Unit #3 = The annual nitrogen oxide emission limit for Unit #3 (3.43 tons per year) as calculated by Equation 2-8;
- Unit #4 = The annual nitrogen oxide emission limit for Unit #4 (8.05 tons per year) as calculated by Equation 2-10;
- Unit #13 = The nitrogen oxide emission limit for Unit #13 (1,314 tons per 12-month rolling period) as calculated by Equation 2-2;
- Unit #14 = The annual nitrogen oxide emission limit for Unit #14 (0.69 tons per year) as calculated by Equation 2-12;
- Unit #15 = The annual nitrogen oxide emission limit for Unit #15 (7.88 tons per year) as calculated by Equation 2-14;
- Unit #25 = The annual nitrogen oxide emission limit for Unit #25 (0.37 tons per year) as calculated by Equation 2-16; and
- Unit #33 = The annual nitrogen oxide emission limit for Unit #33 (0.37 tons per year) as calculated by Equation 2-18.

Equation 2-5

$$ESO_2 = \frac{(Capacity) \times (Operational) \times \left(\frac{(sulfur) \times (157)}{(1,000)} \right)}{(0.14) \times (2,000)}$$

Where:

- ESO₂ = The annual sulfur dioxide emission limit for Unit #2, in tons per year;
- Capacity = The maximum capacity (210 million Btus per hour) of Unit #2 as limited by permit condition 1.1;
- Operational = The maximum number of hours per year (500 hours) Unit #2 is allowed to operate as limited by permit condition 9.9;
- Sulfur = The maximum sulfur content (0.05 percent sulfur by weight) the fuel oil may contain for Unit #2 as limited by permit condition 9.4;
- 0.14 = The heat input of fuel oil, in million Btus per gallon;
- 157/1,000 = The emission factor converting sulfur content to sulfur dioxide from EPA's AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources, Chapter 1.3 – Fuel Oil Combustion, in pounds per gallons; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-6

$$ENO_x = \frac{(Capacity) \times (Operational) \times (Limit)}{(2,000)}$$

Where:

- ENO_x = The annual nitrogen oxide emission limit for Unit #2, in tons per year;
- Capacity = The maximum capacity (210 million Btus per hour) of Unit #2 as limited by permit condition 1.1;
- Operational = The maximum number of hours per year (500) Unit #2 is allowed to operate as limited by permit condition 9.9;
- Limit = The nitrogen oxide emission limit (0.17 pounds per million Btus) for Unit #2 as allowed in permit condition 9.7; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-7

$$ESO_2 = \frac{(Capacity) \times (Operational) \times \left(\frac{(sulfur) \times (142)}{(1,000)} \right)}{(0.14) \times (2,000)}$$

Where:

- ESO₂ = The annual sulfur dioxide emission limit for Unit #3, in tons per year;
- Capacity = The maximum capacity (98 million Btus per hour) of Unit #3 as limited by permit condition 1.1;
- Operational = The maximum number of hours per year (500) Unit #3 is allowed to operate as limited by permit condition 9.9;
- Sulfur = The maximum sulfur content (0.05 percent sulfur by weight) the fuel oil may

contain for Unit #3 as limited by condition 9.4;

- 0.14 = The heat input of fuel oil, in million Btus per gallon;
- 142/1,000 = The emission factor converting sulfur content to sulfur dioxide from EPA's AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources, Chapter 1.3 – Fuel Oil Combustion, in pounds per gallons; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-8

$$ENO_x = \frac{(Capacity) \times (Operational) \times (Limit)}{(2,000)}$$

Where:

- ENO_x = The annual nitrogen oxide emission limit for Unit #3, in tons per year;
- Capacity = The maximum capacity (98 million Btus per hour) of Unit #3 as limited by permit condition 1.1;
- Operational = The maximum number of hours per year (500) Unit #3 is allowed to operate as limited by permit condition 9.9;
- Limit = The nitrogen oxide emission limit (0.14 pounds per million Btus) for Unit #3 as allowed in permit condition 9.7; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-9

$$ESO_2 = \frac{(Capacity) \times (Operational) \times ((sulfur) \times (0.00809))}{(0.7457) \times (2,000)}$$

Where:

- ESO₂ = The annual sulfur dioxide emission limit for Unit #4, in tons per year;
- Capacity = The maximum capacity (1,000 kilowatts) of Unit #4 as limited by permit condition 1.1;
- Operational = The maximum number of hours per year (500) Unit #4 is allowed to operate as limited by permit condition 9.9;
- Sulfur = The maximum sulfur content (0.05 percent sulfur by weight) the fuel oil may contain for Unit #4 as limited by permit condition 9.4;
- 0.7457 = A conversion factor to convert kilowatts to horsepower-hour;
- 0.00809 = The emission factor converting sulfur content to sulfur dioxide from EPA's AP 42, Fifth Edition, Volume I Chapter 3: Stationary Internal Combustion Sources, Chapter 3.4 – Large Stationary Diesel and All Stationary Dual-fuel Engines, in pounds per horsepower-hour; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-10

$$ENO_x = \frac{(Capacity) \times (Operational) \times (Limit)}{(0.7457) \times (2,000)}$$

Where:

- ENO_x = The annual nitrogen oxide emission limit for Unit #4, in tons per year;

- Capacity = The maximum capacity (1,000 kilowatts) of Unit #4 as limited by permit condition 1.1;
- Operational = The maximum number of hours per year (500) Unit #4 is allowed to operate as limited by permit condition 9.9;
- Limit = The nitrogen oxide emission limit (0.024 pounds per horsepower-hour) for Unit #4 as allowed in permit condition 9.7;
- 0.7457 = A conversion factor to convert kilowatts to horsepower-hour; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-11

$$ESO_2 = \frac{(Capacity) \times (Operational) \times ((sulfur) \times (0.00809))}{(2,000)}$$

Where:

- ESO₂ = The annual sulfur dioxide emission limit for Unit #14, in tons per year;
- Capacity = Nominal design rate (420 horsepower) of Unit #14 as limited by permit condition 1.1 and 13.1;
- Operational = The maximum number of hours per year (500) Unit #14 is allowed to operate as limited by permit condition 9.10;
- Sulfur = The maximum sulfur content (0.0015 percent sulfur by weight) the fuel oil may contain for Unit #14 as limited by permit condition 9.4;
- 0.00809 = The emission factor converting sulfur content to sulfur dioxide from EPA's AP 42, Fifth Edition, Volume I Chapter 3: Stationary Internal Combustion Sources, Chapter 3.4 – Large Stationary Diesel and All Stationary Dual-fuel Engines, in pounds per horsepower-hour; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-12

$$ENO_x = \frac{(Capacity) \times (Operational) \times (Limit)}{(2,000) \times (453.6)}$$

Where:

- ENO_x = The annual nitrogen oxide emission limit for Unit #14, in tons per year;
- Capacity = Nominal design rate (420 horsepower) of Unit #14 as limited by permit condition 13.1;
- Operational = The maximum number of hours per year (500) Unit #14 is allowed to operate as limited by permit condition 9.10;
- Limit = The nitrogen oxide emission limit (3.0 grams per horsepower-hour) for Unit #14 as allowed in permit condition 9.7;
- 2,000 = A conversion factor to convert pounds to tons; and
- 453.6 = A conversion factor to convert grams to pounds.

Equation 2-13

$$ESO_2 = \frac{(Capacity) \times (Operational) \times ((sulfur) \times (0.00809))}{(0.7457) \times (2,000)}$$

Where

- ESO₂ = The annual sulfur dioxide emission limit for Unit #15, in tons per year;
- Capacity = Nominal design rate (2,220 kilowatts) of Unit #15 as limited by permit condition 1.1 and 13.1;
- Operational = The maximum number of hours per year (500) Unit #15 is allowed to operate as limited by permit condition 9.10;
- Sulfur = The maximum sulfur content (0.0015 percent sulfur by weight) the fuel oil may contain for Unit #15 as limited by permit condition 9.4;
- 0.7457 = A conversion factor to convert kilowatts to horsepower-hour;
- 0.00809 = The emission factor converting sulfur content to sulfur dioxide from EPA's AP 42, Fifth Edition, Volume I Chapter 3: Stationary Internal Combustion Sources, Chapter 3.4 – Large Stationary Diesel and All Stationary Dual-fuel Engines, in pounds per horsepower-hour; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-14

$$ENO_x = \frac{(Capacity) \times (Operational) \times (Limit)}{(0.7457) \times (2,000) \times (453.6)}$$

Where:

- ENO_x = The annual nitrogen oxide emission limit for Unit #15, in tons per year;
- Capacity = Nominal design rate (2,220 kilowatts) of Unit #15 as limited by permit condition 13.1;
- Operational = The maximum number of hours per year (500) Unit #15 is allowed to operate as limited by permit condition 9.10;
- Limit = The nitrogen oxide emission limit (4.8 grams per horsepower-hour) for Unit #15 as allowed in permit condition 9.7;
- 2,000 = A conversion factor to convert pounds to tons;
- 0.7457 = A conversion factor to convert kilowatts to horsepower-hour; and
- 453.6 = A conversion factor to convert grams to pounds.

Equation 2-15

$$ESO_2 = \frac{(Capacity) \times (Operational) \times ((sulfur) \times (0.00809))}{(2,000)}$$

Where

- ESO₂ = The annual sulfur dioxide emission limit for Unit #25, in tons per year;
- Capacity = Nominal design rate (225 horsepower) of Unit #25 as limited by permit condition 13.1;
- Operational = The maximum number of hours per year (500) Unit #25 is allowed to operate as limited by permit condition 9.10;
- Sulfur = The maximum sulfur content (0.0015 percent sulfur by weight) the fuel oil may contain for Unit #25 as limited by permit condition 9.4;
- 0.00809 = The emission factor converting sulfur content to sulfur dioxide from EPA's AP 42, Fifth Edition, Volume I Chapter 3: Stationary Internal Combustion Sources,

Chapter 3.4 – Large Stationary Diesel and All Stationary Dual-fuel Engines, in pounds per horsepower-hour; and

- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-16

$$ENO_x = \frac{(Capacity) \times (Operational) \times (Limit)}{(2,000) \times (453.6)}$$

Where:

- ENO_x = The annual nitrogen oxide emission limit for Unit #25, in tons per year;
- Capacity = Nominal design rate (225 horsepower) of Unit #25 as limited by permit condition 13.1;
- Operational = The maximum number of hours per year (500) Unit #25 is allowed to operate as limited by permit condition 9.10;
- Limit = The nitrogen oxide emission limit (3.0 grams per horsepower-hour) for Unit #25 as allowed in permit condition 9.7;
- 2,000 = A conversion factor to convert pounds to tons; and
- 453.6 = A conversion factor to convert grams to pounds.

Equation 2-17

$$ESO_2 = \frac{(Capacity) \times (Operational) \times ((sulfur) \times (0.00809))}{(2,000)}$$

Where:

- ESO₂ = The annual sulfur dioxide emission limit for Unit #33, in tons per year;
- Capacity = Nominal design rate (225 horsepower) of Unit #33 as limited by permit condition 13.1;
- Operational = The maximum number of hours per year (500) Unit #33 is allowed to operate as limited by permit condition 9.10;
- Sulfur = The maximum sulfur content (0.0015 percent sulfur by weight) the fuel oil may contain for Unit #33 as limited by permit condition 9.4;
- 0.00809 = The emission factor converting sulfur content to sulfur dioxide from EPA's AP 42, Fifth Edition, Volume I Chapter 3: Stationary Internal Combustion Sources, Chapter 3.4 – Large Stationary Diesel and All Stationary Dual-fuel Engines, in pounds per horsepower-hour; and
- 2,000 = A conversion factor to convert pounds to tons.

Equation 2-18

$$ENO_x = \frac{(Capacity) \times (Operational) \times (Limit)}{(2,000) \times (453.6)}$$

Where:

- ENO_x = The annual nitrogen oxide emission limit for Unit #33, in tons per year;
- Capacity = Nominal design rate (225 horsepower) of Unit #33 as limited by permit condition 13.1;
- Operational = The maximum number of hours per year (500) Unit #3 is allowed to

operate as limited by permit condition 9.10;

- Limit = The nitrogen oxide emission limit (3.0 grams per horsepower-hour) for Unit #3 as allowed in permit condition 9.7;
- 2,000 = A conversion factor to convert pounds to tons; and
- 453.6 = A conversion factor to convert grams to pounds.

Units #14, #15, #25, and #33 already have an operational limit of 500 hours per 12-month period per unit. DENR will place an operational limit of 500 hours per 12-month period per unit on Unit #2, #3, and #4 in a new permit condition to ensure compliance with the above limits.

Using the specific emission limits for each unit, the netting analysis is broken down with Equations 2-19 through 2-21. Equation 2-19 identifies that the potential sulfur dioxide and nitrogen oxide increase for the Big Stone II project would be 2,268 tons per year and 1,323 tons per year, respectively.

Equation 2-19a – Sulfur Dioxide

$$ESO_2 = (Unit\#13) + (Unit\#14) + (Unit\#15) + (Unit\#25) + (Unit\#33)$$

Where:

- Unit #13 = The sulfur dioxide emission limit for Unit #13 (2,268 tons per 12-month rolling period) as calculated by Equation 2-1;
- Unit #14 = The sulfur dioxide emission limit for Unit #14 (0.00 tons per year) as calculated by Equation 2-11;
- Unit #15 = The sulfur dioxide emission limit for Unit #15 (0.01 tons per year) as calculated by Equation 2-13;
- Unit #25 = The sulfur dioxide emission limit for Unit #25 (0.00 tons per year) as calculated by Equation 2-15; and
- Unit #33 = The sulfur dioxide emission limit for Unit #33 (0.00 tons per year) as calculated by Equation 2-17.

Equation 2-19b – Nitrogen Oxide

$$ENO_x = (Unit\#13) + (Unit\#14) + (Unit\#15) + (Unit\#25) + (Unit\#33)$$

Where:

- Unit #13 = The nitrogen oxide emission limit for Unit #13 (1,314 tons per 12-month rolling period) as calculated by Equation 2-2;
- Unit #14 = The nitrogen oxide emission limit for Unit #14 (0.69 tons per year) as calculated by Equation 2-12;
- Unit #15 = The nitrogen oxide emission limit for Unit #15 (7.88 in tons per year) as calculated by Equation 2-14;
- Unit #25 = The nitrogen oxide emission limit for Unit #25 (0.37 tons per year) as calculated by Equation 2-16; and
- Unit #33 = The nitrogen oxide emission limit for Unit #33 (0.37 tons per year) as calculated by Equation 2-18.

Equation 2-20 identifies the sulfur dioxide and nitrogen oxide emission decreases creditable to

the existing Big Stone I facility are 2,269 tons per year and 1,323 tons per year.

Equation 2-20a – Sulfur Dioxide

$$ESO_2 = (13,278) - [(Unit\#1) + (Unit\#2) + (Unit\#3) + (Unit\#4)]$$

Where:

- 13,278 = The original plantwide cap, in tons per year;
- Unit #1 = The sulfur dioxide emission limit for Unit #1 (11,005 tons per 12-month rolling period) as calculated by Equation 2-3;
- Unit #2 = The sulfur dioxide emission limit for Unit #2 (2.94 tons per year) as calculated by Equation 2-5;
- Unit #3 = The sulfur dioxide emission limit for Unit #3 (1.24 tons per year) as calculated by Equation 2-7; and
- Unit #4 = The sulfur dioxide emission limit for Unit #4 (0.14 tons per year) as calculated by Equation 2-9.

Equation 2-20b – Nitrogen Oxide

$$ENO_x = (16,448) - [(Unit\#1) + (Unit\#2) + (Unit\#3) + (Unit\#4)]$$

Where:

- 16,448 = The original plantwide cap, in tons per year;
- Unit #1 = The nitrogen oxide emission limit for Unit #1 (15,104 tons per 12-month rolling period) as calculated by Equation 2-4;
- Unit #2 = The nitrogen oxide emission limit for Unit #2 (8.93 tons per year) as calculated by Equation 2-6;
- Unit #3 = The nitrogen oxide emission limit for Unit #3 (3.43 tons per year) as calculated by Equation 2-8; and
- Unit #4 = The nitrogen oxide emission limit for Unit #4 (8.05 tons per year) as calculated by Equation 2-10.

If Equation 2-21 is a true statement then Otter Tail Power Company has reduced the actual emissions from the Big Stone I facility more than the increase of emissions attributable to the Big Stone II project. This would verify that Otter Tail Power Company has netted out of the PSD program for sulfur dioxide and nitrogen oxide. Plugging the increases and decreases in Equation 2-21 as determined above results in Equation 2-21 being a true statement. Therefore, there is a no emission increase of sulfur dioxide or nitrogen oxide.

Equation 2-21

$$(BSII_{increase}) - (BSI_{decrease}) \leq 40$$

Where:

- $BSII_{increase}$ = 2,268 tons of sulfur dioxide per year or 1,323 tons of nitrogen oxides per year as identified in Equation 2-19a; and
- $BSI_{decrease}$ = 2,269 tons of sulfur dioxide per year or 1,323 tons of nitrogen oxides per year as identified in Equation 2-20a.

EPA was also concerned with where the continuous emission monitoring equipment would be

located. DENR believes the proposed Title V air quality permit did identify where to locate the continuous emission monitoring equipment, but added additional language to permit condition 8.4 on where the continuous emission monitoring systems are to be located. Attachment A provides a schematic of the approximate locations of the continuous emission monitoring systems.

DENR revised permit condition 9.8 to identify that the emissions from Unit #1 must be routed through the wet scrubber before Unit #13 may begin operations. By revising this condition, DENR believes it has resolved EPA's objection related to netting that identifies that the emissions reductions have to actually occur prior to the operations of Unit #13.

By placing these conditions in the proposed Title V air quality permit, DENR has resolved EPA's objection related to netting and where the continuous emission monitoring systems are to be located to demonstrate compliance.

2.2-2 Impermissible Shield

EPA is objecting to the sentences that identify that Otter Tail Power Company may forgo a PSD review in permit conditions 9.2 and 9.4 of the proposed Title V air quality permit, which identifies that the plantwide limits allow the Big Stone II project to forgo a PSD review for sulfur dioxide and nitrogen oxide because EPA states the language constitutes an impermissible shield against enforcement of the PSD applicability determination. To resolve EPA's objection, EPA requires DENR to delete these sentences from permit condition 9.2 and 9.4.

DENR included this language based on EPA's recommendation in the past. These sentences clearly identify what regulations a source is avoiding by accepting enforceable limits. However, now that EPA is objecting to it in this permit, we will delete these sentences in permit condition 9.2 and 9.4. This proposed change resolves EPA's objection to this matter.

2.3 Inadequate Compliance Provisions – Sulfur Dioxide and Nitrogen Oxide

EPA objected because the proposed Title V air quality permit did not specify where the continuous emission monitoring systems were to be located and how compliance with the sulfur dioxide and nitrogen oxide emission limits would be demonstrated.

EPA also submitted comments identifying that the data substitution methods should be identified. Under Title IV of the Clean Air Act, also known as the Acid Rain Program, Congress set a goal of reducing annual sulfur dioxide emissions by 10 million tons below 1980 levels. The Acid Rain Program also called for a 2 million ton reduction in nitrogen oxide emissions by the year 2000. To achieve these reductions, the law required a two-phase tightening of the restrictions placed on fossil fuel-fired power plants.

Phase I began in 1995 and affected 263 units. An additional 182 units joined Phase I of the program, bringing the total of Phase I affected units to 445. Phase II, which began in the year 2000, encompasses over 2,000 units in all. The program affects existing utility units serving

generators with an output capacity of greater than 25 megawatts and all new utility units. EPA promulgated regulations under 40 CFR Parts 72, 73, 74, 75, and 76 to implement Title IV of the Clean Air Act. These regulations went through a detailed public participation process before being promulgated. Under 40 CFR Part 75, EPA promulgated regulations specific for the continuous emission monitoring systems that would be used to calculate the sulfur dioxide and nitrogen oxide emissions generated from these 2,000 plus units. EPA also developed a webpage (<http://camddataandmaps.epa.gov/gdm/>) that maintains the current and historical emissions of existing units and is set up to incorporate any new units that come online. EPA's webpage gives detailed information on coal fired utility units such as Otter Tail Power Company's existing Big Stone I facility and will provide detail information on Big Stone II's facility. Therefore, these detailed regulations that are designed to monitor and calculate the sulfur dioxide and nitrogen oxide emissions are a valid and a proven tool to use to demonstrate compliance with the emission limitations.

DENR identified the specific equations that will be used to calculate the 12-month rolling totals. For sulfur dioxide, DENR combined Equations F-1 and F-3 in 40 CFR Part 75, Appendix F. For nitrogen oxide, DENR combined the Equations F-6, F-15, and F-18a in 40 CFR Part 75, Appendix F. There is a slight difference in the calculations. DENR is requiring the calculations to be conducted on a monthly basis instead of a quarterly basis.

The regulations also provide details and procedures that occur during periods of times when the continuous emission monitoring system is not in operation or is not operating properly. In particular, under 40 CFR Part 75 Subpart D – Missing Data Substitution Procedure, the regulations detail procedures for substituting missing data for operations with or without controls depending on the amount of data that is available to be used. This provision also identifies under 40 CFR 75.34, that Otter Tail Power Company has to provide parametric data to verify that the add-on controls were working properly as discussed in the required quality control/quality assurance program. If Otter Tail Power Company is unable to provide parametric data to verify that add-on controls were working properly, 40 CFR 75.34 identifies that the maximum identified concentration shall be used as defined in the regulation or a monitor that was measuring the inlet to the control device may be used.

DENR proposed for any period that missing data occurs had to be replaced by the Missing Data Substitution Procedures in permit condition 8.4 when it referenced the requirements in 40 CFR Part 75 Subpart D and E.

DENR considers the Acid Rain Programs continuous emission monitoring requirements, which include the missing data substitution procedures for when the control devices are or are not properly working as sufficient to meet EPA's objection. DENR has specified in a permit conditions the equations and procedures that will be used to meet this objection.

The response to this objection was also discussed in section 2.2-1 of this document. DENR has resolved EPA's objection related to this issue.

2.4 Inadequate Compliance Provisions – Hazardous Air Pollutants

2.4-1 First Opportunity to Review Chapter 11.0

EPA states its first opportunity to review the language in Chapter 11.0 dealing with hazardous air pollutants was in the proposed Title V air quality permit. EPA goes on to state that the permit record for the draft Title V air quality permit gave no indication that such an approach might ultimately be included in the proposed Title V air quality permit. EPA recommends that Chapter 11.0 be re-public noticed and the public notice should clearly state that the permitting action includes a potential to emit limit to avoid a Case-by-Case MACT review and the statement of basis should fully discuss the basis for the proposed limits.

It is true that the draft Title V air quality permit did not contain this language because at that time, federal New Source Performance Standards under 40 CFR Part 60, Subparts Da and HHHH were applicable to Unit #13 associated with Big Stone II and contained mercury limits and mercury caps. Mercury is considered a hazardous air pollutant. However, during the 30-day public notice period of the draft Title V air quality permit, the mercury limit in 40 CFR Part 60, Subpart Da and 40 CFR Part 60, Subpart HHHH were vacated by a federal court.

Both EPA and the Sierra Club identified this in their comments on the draft Title V air quality permit. Both EPA and the Sierra Club discussed the possibility of a Case-by-Case Maximum Achievable Control Technology (MACT) review being required for Unit #13 because the rule had been vacated and the potential emissions of hazardous air pollutants was greater than the major source threshold under the Title V air quality program. DENR discussed this issue with Otter Tail Power Company and they requested enforceable conditions that would limit hazardous air pollutant emissions from Unit #13 to less than the major source threshold to avoid being applicable to a Case-by-Case MACT review.

DENR agreed with Otter Tail Power Company and placed hazardous air pollutant emission limits on Unit #13 in DENR's final permit decision on the draft Title V air quality permit. DENR placed a long term limit of 9.5 tons per 12-month period for a single hazardous air pollutant; 23.8 tons per 12-month period for a combination of hazardous air pollutants; short term limits on mercury, hydrogen chloride, and hydrogen fluoride emissions; required a continuous emission monitoring system for mercury emissions; required an initial stack performance test for hydrogen chloride and hydrogen fluoride; and a weekly coal analysis to determine the chloride and fluoride content in the coal being burned. These requirements were established by DENR and were to be used in combination to ensure compliance with hazardous air pollutant limits and make the requirements enforceable.

The change to the draft Title V air quality permit resulted from the federal rule being vacated and the comments received on the draft Title V air quality permit. DENR discussed the reason for this change and the proposed limits in its "Response to Comments" and provided it to those that commented, including EPA, and placed the "Response to Comments" and the final permit decision on our website for those that were interested in the Big Stone II project, but did not provide comments.

DENR believes the new language is more restrictive than the original language since EPA's rules that were vacated included only limits on mercury emissions. In addition to mercury emission limits being maintained in the final permit decision, the language in Chapter 11.0 also restricts hydrogen chloride and hydrogen fluoride emissions. Once DENR makes its final permit decision, those who commented have 30 days to request a contested case hearing or join in a contested case hearing if they disagreed with DENR's final permit decision. In addition, testimony was provided for and against the language during the contested case hearing. The proposed Title V air quality permit, including the language in Chapter 11.0, were reviewed by the public and discussed during the contested case hearing. Therefore, DENR believes the public and EPA had ample opportunity to comment on the language before the Board issued the proposed Title V air quality permit and ordered DENR to submit it to EPA for approval.

Although DENR believes the proposed language Chapter 11.0 was a direct result of the public notice process, DENR will include the permit conditions in Chapter 11.0 related to the plantwide limits on hazardous air pollutant in a second public notice as part of the process to resolve EPA's objections. DENR believes that the basis for the hazardous air pollutant emission limits has already been discussed in the "Response to Comments" and during the contested case hearing in front of the Board (See pages 273 through 274, 588 through 592, and 1246 through 1248 in the hearing transcripts). Therefore, EPA's recommendation that the statement of basis should fully discuss the basis for the proposed limits is already part of the record for the proposed Title V air quality permit.

2.4-2 Specifying Test Method and Frequency

Permit condition 11.3 and 11.4 of the proposed Title V air quality permit place limits on the amount of hydrogen fluoride and hydrogen chloride that can be emitted from Unit #13, respectively. EPA states that these two conditions do not satisfy periodic monitoring requirements because a one time stack test is not sufficient for demonstrating compliance and because DENR did not specify the test method. To resolve EPA's objection, EPA is requiring DENR to revise permit condition 11.3 and 11.4 to specify Method 13A or 13B of 40 CFR Part 60, Appendix A be used to demonstrate compliance with the hydrogen fluoride emission limit and Method 26 for hydrogen chloride unless DENR can provide a valid reason in the permit record as to why some other method should be specified instead. EPA indicated that DENR could reference permit condition 7.12, since it specifies the stack testing requirements but indicates DENR must develop periodic monitoring requirements that assure compliance with the permit conditions.

EPA identified Method 13A and 13B for demonstrating compliance with the hydrogen fluoride emission limit. However, Method 13A and 13B determines total fluoride emissions, which is not appropriate for determining hydrogen fluoride emission rates. EPA identified Method 26 for demonstrating compliance with the hydrogen chloride emission limit. Method 26 identifies that this method is inappropriate to use for sources that use a wet scrubber. This method is not appropriate in this case since Otter Tail Power Company is using a wet scrubber. In permit condition 7.2, DENR requires all stack tests to be conducted using EPA approved stack

performance test methods. In permit condition 7.4, Otter Tail Power Company is required to submit a test plan in which it specifies which EPA approved test method will be used to demonstrate compliance. In this manner, if there is more than one test method that will provide the proper results to demonstrate compliance, the source can propose the test method in the test plan which gives DENR the opportunity to determine if we agree or require a different test method. Even though DENR believes it has specified the test method and satisfies EPA's objection pertaining to specifying a test method, DENR revised permit condition 7.12 to specify that EPA Method 26A shall be used to determine the hydrogen fluoride and hydrogen chloride emissions.

Permit condition 7.12 requires Otter Tail Power Company to conduct an initial stack performance test within 180 days of the initial startup of Unit #13 to demonstrate compliance with the hydrogen fluoride and hydrogen chloride emission limits in permit condition 11.3 and 11.4, respectively. To address EPA's concern on periodic monitoring, DENR will revise permit condition 7.12 by requiring Otter Tail Power Company to conduct an initial stack test as already specified, but also require an annual stack test thereafter. The stack test will determine the hydrogen fluoride and hydrogen chloride emission rates and determine the hydrogen fluoride and hydrogen chloride control efficiency across the control device.

DENR believes it has resolved EPA's objections based on specifying test methods and frequency.

2.4-3 Demonstrating Compliance with Annual Limit

EPA states that the unit wide hazardous air pollutant emission limit in permit condition 11.5 of the proposed Title V air quality permit does not indicate if startup, shutdown, and malfunctions were considered in establishing the proposed limit and does not indicate how compliance will be demonstrated. To resolve EPA's objection, EPA is requiring permit condition 11.5 be revised as follows:

- A requirement specifying how Otter Tail Power Company will demonstrate compliance with the individual and combined long term hazardous air pollutant limits;
- Develop a periodic monitoring plan that assures compliance with the permit conditions by specifying where to take the emission measurements, identifying frequency, etc.; and
- Include a discussion on how periods of startup, shutdown and malfunctions are considered in demonstrating compliance.

DENR revised permit condition 11.5 by establishing an equation to demonstrate compliance with the limits. DENR has already agreed to increase the stack test frequency for hydrogen fluoride and hydrogen chloride after the initial stack test to an annual stack test. In permit condition 11.7, Otter Tail Power Company is required to obtain a weekly composite coal sample and have it tested for fluoride and chloride content by weight. To specify how the stack tests and coal analysis will be used to determine compliance with the hazardous air pollutant emission limits in permit condition 11.5, DENR added a permit condition that identifies how each will be used to determine compliance. In the equation, DENR considered the other hazardous air pollutants as identified in Otter Tail Power Company's application as well. To account for the insignificant

hazardous air pollutants, DENR determined the potential hazardous air pollutant emissions for these insignificant hazardous air pollutants and placed that amount in the equation for the combined hazardous air pollutant emission limit of 23.8 tons per 12-month period.

DENR did not exempt startup, shutdown, and malfunctions, in determining long term hazardous air pollutant emissions in permit condition 11.5. Therefore, startup, shutdown and malfunctions are included in determining the 12-month totals. The permit condition DENR added to resolve EPA concerns on how compliance would be demonstrated further illustrates this by requiring all of the coal burned in Unit #13 to be used in the equation for determining the monthly hazardous air pollutant emissions.

With these new conditions, DENR believes it has resolved EPA's objection as it pertains to demonstrating compliance with the annual hazardous air pollutant emission limits and addressing startup, shutdown and malfunctions.

3.0 Recommendation

DENR has addressed all of EPA's objections by revising the proposed Title V air quality permit or providing additional information. The revisions to the proposed Title V air quality permit may be viewed in Appendix B and will be public noticed for comments. However, comments during the public notice will be limited to the revisions DENR is proposing to resolve EPA's objections. Any questions pertaining to this permit recommendation should be directed to Kyrik Rombough, Natural Resources Engineering Director.

Attachment A
Big Stone I and Big Stone II
SCHEMATIC - SO₂ AND NO_x MONITOR LOCATIONS

SO₂ CEMS Locations¹:

CEM1 = Sulfur dioxide continuous monitoring system located in the stack associated with Unit #1

CEM2 = Sulfur dioxide continuous monitoring system located in the Unit #1 duct upstream of the wet flue gas desulfurization control device

CEM3 = Sulfur dioxide continuous monitoring system located in the Unit #13 duct upstream of the wet flue gas desulfurization control device

CEM4 = Sulfur dioxide continuous monitoring system located in the stack associated with Unit #13 downstream of the wet flue gas desulfurization control device

¹Includes SO₂ monitor and flue gas flow monitor

NO_x CEMS Locations²:

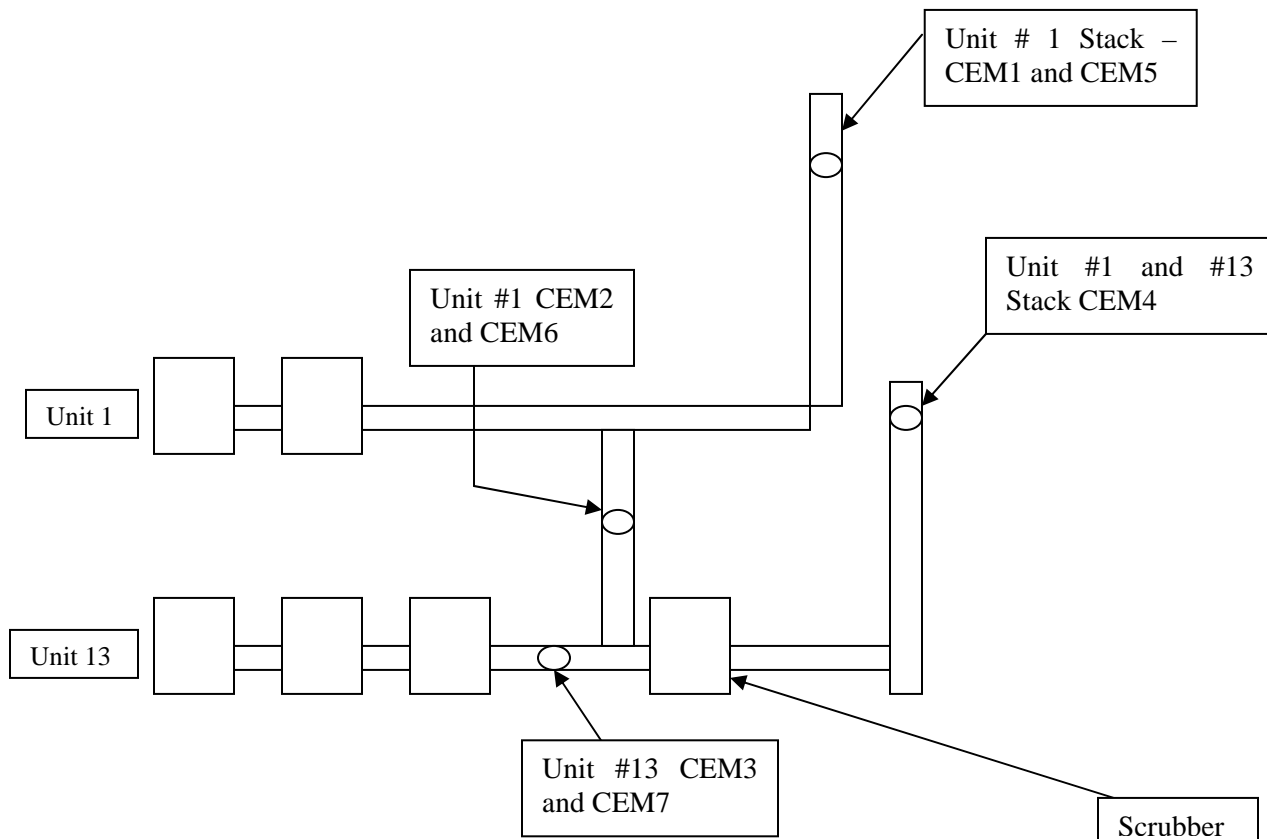
CEM5 = Nitrogen oxide continuous monitoring system located in the stack associated with Unit #1

CEM6 = Nitrogen oxide continuous monitoring system located in the Unit #1 duct upstream of the wet flue gas desulfurization control device

CEM7 = Nitrogen oxide continuous monitoring system located in the Unit #13 duct upstream of the wet flue gas desulfurization control device

²Includes NO_x monitor and CO₂ monitor

The monitoring will include sufficient data to determine the flue gas flow rate and heat input.



Appendix B

Revisions to Proposed Title V Air Quality Permit

The following changes to the proposed Title V air quality permit represent changes being proposed to resolve EPA's objections that were submitted to DENR on January 22, 2009. Additions to the proposed Title V air quality permit are represented in blue, bold, and underlined and deletions are represented in red with overstrikes. In the case where permit conditions are deleted or added between permit conditions, the permit conditions will be renumbered appropriately when the permit is issued.

5.0 RECORD KEEPING AND REPORTING REQUIREMENTS

5.5 Monthly records. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall calculate and record the following each month:

1. Following the initial startup of Unit #13, the amount of sulfur dioxide emitted into the ambient air from Unit #1 and #13 for the month, in tons, ~~emitted into the ambient air from Unit #1, #2, #3, #4, #13, #14, #15, #25 and #33 during the month~~ and during the 12-month rolling period ending that month, in tons, and supporting documentation;
2. Following the initial startup of Unit #13, the amount of nitrogen oxide emitted into the ambient air from Unit #1 and #13, in tons, ~~emitted into the ambient air from Unit #1, #2, #3, #4, #13, #14, #15, #25 and #33 during the month~~ and during the 12-month rolling period ending that month, in tons, and supporting documentation;
3. Following the initial startup of Unit #13, the amount of plantwide mercury, in tons, emitted into the ambient air during the month and during the 12-month rolling period ending that month and supporting documentation;
4. Following the initial startup of Unit #13, the amount of hazardous air pollutants (~~individually~~ hydrogen fluoride, hydrogen chloride, and the total hazardous air pollutants ~~any combination~~), in tons, emitted into the ambient air from Unit #13 during the month and during the 12-month rolling period ending that month and supporting documentation;
5. Following the initial startup of Unit #13, the number of hours Unit #2, #3, #4, #14, #15, #25, and #33 operated, in hours, during the month and during the 12-month rolling period ending that month and supporting documentation;
6. The total amount of refuse derived fuel burned in Unit #1 per month, in pounds or tons;
7. The total amount of subbituminous coal and alternative fuels and waste, except refuse derived fuel, burned in Unit #1 per month, in pounds or tons;
8. The amount of particulate matter 10 microns in diameter or less emitted into the ambient air from Unit #12 during the month and during the 12-month rolling period ending that month; and
9. The amount of plastic chips, granulated insulation, gasket and "O" rings, manufactured wood waste containing formaldehyde resins and materials, tube forms, rubber belting, and petroleum coke burned in Unit #1 per month, in tons, during the month and during the 12-month rolling period ending that month.

5.9 Quarterly reports. In accordance with ARSD 74:36:05:16.01(9), the owner or operator

shall submit a quarterly report. The report shall contain the following information:

1. Name of the facility, permit number, reference to this permit condition, and identify the submittal as a quarterly report;
2. Calendar dates covered in the quarterly report;
- ~~3. Following the initial startup of Unit #13, the quantity of sulfur dioxide and nitrogen oxide emitted from Unit #1, #2, #3, #4, #13, #14, #15, #25 and #33, in tons, for each month and the 12-month rolling total for each month in the reporting period and supporting documentation;~~
4. Following the initial startup of Unit #13, the quantity of sulfur dioxide emissions from Unit #1 and #13, in tons per month; the 12-month rolling total, in tons, for each month in the reporting period, if the owner or operator is in compliance with the sulfur dioxide emission limits in permit condition 9.2; and supporting documentation;
5. Following the initial startup of Unit #13, the quantity of nitrogen oxide emissions from Unit #1 and #13, in tons per month; the 12-month rolling total, in tons, for each month in the reporting period, if the owner or operator is in compliance with the nitrogen oxide emission limits in permit condition 9.5; and supporting documentation;
6. The quantity of particulate matter 10 microns in diameter or less emitted from Unit #12, in tons, for each month and the 12-month rolling total for each month in the reporting period and supporting documentation;
7. Following the initial startup of Unit #13, the quantity of plantwide mercury emitted, in tons, for each month and the 12-month rolling total for each month in the reporting period and supporting documentation;
8. Following the initial startup of Unit #13, the quantity of hazardous air pollutants (~~individually and any combination~~ hydrogen fluoride, hydrogen chloride, and the total hazardous air pollutants) emitted from Unit #13, in tons, for each month and the 12-month rolling total for each month in the reporting period and supporting documentation;
9. The quantity of plastic chips, granulated insulation, gasket and “O” rings, manufactured wood waste containing formaldehyde resins and materials, tube forms, rubber belting, and petroleum coke burned in Unit #1, in tons, for each month and the 12-month rolling period for each month in the reporting period and supporting documentation;
10. A summary of the excess emissions as determined by the continuous emission monitoring systems:
 - a. The magnitude of opacity for all six minute block averages where the average opacity was greater than or equal to 20 percent;
 - b. The date and duration of the excess emissions;
 - c. The causes of the excess emissions (startup/shutdown, control equipment problems, process problems, other known causes, or unknown causes); and
 - d. The percentage of time the excess emissions occurred during operation of the permitted unit;
7. The amount of time a continuous emission monitoring system was down due to monitoring equipment malfunction, non-monitoring malfunction, quality assurance calibrations, other known causes, or unknown causes;
8. The percentage of time a monitoring system was down while the permitted unit was in operation;

9. The percentage of refuse derived fuel, by weight, burned in Unit #1 during the calendar quarter; and
10. A summary of the time period that the pressure drop for those units specified in permit condition 8.6 was not within the range noted.

The first quarterly report shall be submitted at the end of the calendar quarter that this permit is issued. All other quarterly reports shall be postmarked no later than the 30th day following the end of each calendar quarter (i.e. January 30th, April 30th, July 30th, and October 30th).

5.12 Operational records. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(9), the owner or operator shall maintain records on the length of time Unit #2, #3, #4, #7, #14, #15, #25, #30 and #33 operated during each day and calendar month. A 12-month rolling total for Unit #2, #3, #4, #7, #14, #15, #25, #30 and #33 shall be calculated for each calendar month.

7.0 PERFORMANCE TESTS

7.11 Periodic performance test for Unit #1. In accordance with ARSD 74:36:11:02, the owner or operator shall conduct periodic performance tests on Unit #1 to determine the emission rate of particulate matter 10 microns in diameter or less (filterable). The initial performance test on Unit #1 shall be conducted within 180 days ~~after~~ **of** permit issuance. A second test shall be completed within 540 to 720 days after the initial test was completed.

7.12 ~~Initial~~ Periodic performance test for hazardous air pollutants. In accordance with ARSD 74:36:11:02, the owner or operator shall conduct an initial performance test on Unit #13. The initial performance test shall be conducted within 180 days after initial startup of Unit #13. **The owner or operator shall conduct an annual performance test during each calendar year starting with the calendar year after the initial performance test was completed. Each subsequent performance test shall not be conducted within 180 days after the previous performance test. The performance tests shall** ~~to~~ determine the hydrogen fluoride and hydrogen chloride emission rates in pounds per hour from Unit #13 **using 40 CFR Part 60, Appendix A, Method 26A,** and the hydrogen fluoride and hydrogen chloride control efficiencies **across the control devices. The control efficiency will be based on a coal analysis of the coal being burned in Unit #13 during the performance test to determine the amount of fluorides and chlorides and a stack test conducted on the exhaust stack for Unit #13. The control efficiency shall be based on Equations 7-1, 7-2, and 7-3;**

Equation 7-1

$$HCE = \frac{(H) - (HT)}{H}$$

Where:

- H = Potential hydrogen fluoride or hydrogen chloride emissions from Unit #13, in pounds per hour, emitted during the performance test as calculated by Equation 7-2 or 7-3;
- HCE = The calculated control efficiency its decimal form (e.g. 95% equates to 0.95); and
- HT = Hydrogen fluoride or hydrogen chloride emissions from Unit #13 as determined by the performance test in pounds per hour.

Equation 7-2

$$HF = \frac{(F)(CU)(1.053)}{(1,000,000)}$$

Where:

- HF = Potential hydrogen fluoride emissions from Unit #13, in pounds per hour, during a performance test run;
- F = Average fluoride content of the coal, in parts per million by weight on a wet basis, for the performance test run;
- CU = Amount of coal burned during the performance test run, in tons on a wet basis;
- 1.053 = Conversion factor to convert fluoride to hydrogen fluoride; and
- 1,000,000 = Conversion factor to convert parts per million to a decimal form.

Equation 7-3

$$HCl = \frac{(Cl)(CU)(1.028)}{(1,000,000)}$$

Where:

- HCl = Hydrogen chloride emissions from Unit #13, in pounds per hour, during a performance test run;
- Cl = Average chloride content of the coal, in parts per million by weight on a wet basis, for the performance test run;
- CU = Amount of coal burned during the performance test run, in tons on a wet basis;
- 1.028 = Conversion factor to convert chloride to hydrogen chloride; and
- 1,000,000 = Conversion factor to convert parts per million to a decimal form.

8.0 MONITORING

8.4 Continuous emission monitoring systems. In accordance with ARSD 74:36:05:16.01(9), 74:36:16:04 as referenced to 40 CFR § 75, 74:36:07:03 as referenced to § 60.49Da, and 74:36:19:15, the owner or operator shall install, calibrate, maintain, and operate continuous emission monitoring systems on the exhaust stack for Unit #1 for opacity, carbon dioxide, sulfur dioxide (CEM1), nitrogen oxide (CEM5), and flue gas flow, on Unit #1 upstream of the wet flue gas desulfurization control device for opacity, carbon dioxide,

sulfur dioxide (CEM2), nitrogen oxide (CEM6), and flue gas flow, on Unit #13 upstream of the wet flue gas desulfurization control device for opacity, carbon dioxide, sulfur dioxide (CEM3), nitrogen oxide (CEM7), carbon monoxide, and flue gas flow, and on the exhaust stack after the wet flue gas desulfurization control device ~~continuous emission monitoring systems for carbon dioxide,~~ sulfur dioxide (CEM4), ~~nitrogen oxide,~~ and flue gas flow ~~on Unit #13~~. The continuous monitoring systems for Unit #1 upstream of the wet flue gas desulfurization control device are required to be installed and operational prior to the initial startup of Unit #13. The continuous monitoring systems for ~~on~~ Unit #13 are required to be installed and operational prior to or upon initial startup of Unit #13. The Unit #1 continuous monitoring systems upstream of the wet flue gas desulfurization control device must be certified by the earlier of 90 unit operation days or 180 calendar days after the Unit #1's emissions are routed through the new stack. The Unit #13 continuous monitoring systems must be certified by the earlier of 90 unit operation days or 180 calendar days after the unit commences commercial operation. The continuous emission monitoring systems shall measure and record the emissions at all times, including periods of startup, shutdown, malfunction or emergency conditions. Monitor downtime is allowed for system breakdowns, repairs, calibration checks, zero and span adjustments, and when Unit #1 and #13 are not in operation.

Sulfur dioxide and nitrogen oxide emissions during continuous emission monitor downtime when Unit #1 and/or #13 are operational shall be determined in accordance with ARSD 74:36:16, as referenced to 40 CFR Part 75, Subpart D and E.

9.0 PSD EXEMPTION

9.2 ~~Plantwide sulfur~~ Sulfur dioxide limit. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air ~~greater than 13,278 tons of~~ sulfur dioxide emissions in excess of the ~~per~~ 12-month rolling ~~period~~ emission limit specified in Table 9-1 ~~from Unit #1, #2, #3, #4, #13, #14, #15, #25 and #33,~~ regardless of the sulfur dioxide allowances provided in permit condition 10.1. The ~~plantwide~~ 12-month rolling emission limits includes periods of startup, shutdown, and malfunction. The first month of the 12-month rolling total shall begin the month of the initial startup of Unit #13.

Table 9-1 – Sulfur Dioxide Emission Limits

<u>Description</u>	<u>Emission Limit</u>
<u>Unit #1</u>	<u>11,005 tons per 12-month rolling period</u>
<u>Unit #13</u>	<u>2,268 tons per 12-month rolling period</u>

~~The plantwide sulfur dioxide limit allows Unit #13, #14, #15, #25 and #33 to forgo a Prevention of Significant Deterioration review for sulfur dioxide.~~ Any relaxation in the permit that increases applicable emissions greater than ~~13,278~~ 11,005 tons of sulfur dioxide per 12-month rolling period for Unit #1 or 2,268 tons of sulfur dioxide per 12-month rolling period for Unit #13 or a violation of the ~~plantwide~~ sulfur dioxide limit(s) in Table 9-1 shall require a full Prevention of Significant Deterioration review for sulfur dioxide as though construction had not commenced on

those sources.

~~The compliance demonstration for the plantwide limit shall be a summation of sulfur dioxide emissions released from Unit #1, #2, #3, #4, #13, #14, #15, #25 and #33. The sulfur dioxide emissions from Unit #1 and #13 shall be based on the continuous emission monitoring system associated with each unit. The sulfur dioxide emissions from Unit #2, #3, #4, #14, #15, #25 and #33 shall be based on the highest sulfur content specified in the fuel supplier's certification form or actual test results of the fuel burned and the amount of fuel burned in each unit.~~

9.3 Sulfur dioxide monthly emission calculations. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall calculate sulfur dioxide emissions from Unit #1 and #13 each month as identified in Equations 9-1a and 9-1b, respectively.

Equation 9-1a – Unit #1

$$Unit\ #1_{SO_2} = (CEM1) + \left((CEM4) \times \left(\frac{(CEM2)}{(CEM2) + (CEM3)} \right) \right)$$

Where:

- **Unit #1_{SO2} = Sulfur dioxide emissions, in tons per month, from Unit #1;**
- **CEM1 = Sulfur dioxide emissions, in tons per month, from Unit #1 emitted from the stack associated with Unit #1 and measured by a continuous emission monitoring system specified in permit condition 8.4;**
- **CEM2 = Sulfur dioxide emissions, in tons per month, from Unit #1 that are measured by the continuous emission monitoring system specified in permit condition 8.4 and located upstream of the wet flue gas desulfurization control device;**
- **CEM3 = Sulfur dioxide emissions, in tons per month, from Unit #13 that are measured by the continuous emission monitoring system specified in permit condition 8.4 and located upstream of the wet flue gas desulfurization control device; and**
- **CEM4 = Sulfur dioxide emissions, in tons per month, from Unit #1 and #13 that are emitted from the stack associated with Unit #13, measured by a continuous emission monitoring system specified in permit condition 8.4, and located downstream of the wet flue gas desulfurization control device.**

Equation 9-1b – Unit #13

$$Unit\ #13_{SO_2} = \left((CEM4) \times \left(\frac{(CEM3)}{(CEM2) + (CEM3)} \right) \right)$$

Where:

- **Unit #13_{SO2} = Sulfur dioxide emissions, in tons per month, from Unit #13;**
- **CEM2 = Sulfur dioxide emissions, in tons per month, from Unit #1 that are measured by the continuous emission monitoring system specified in permit condition 8.4 and located upstream of the wet flue gas desulfurization control device;**
- **CEM3 = Sulfur dioxide emissions, in tons per month, from Unit #13 that are measured by the continuous emission monitoring system specified in permit condition 8.4 and located upstream of the wet flue gas desulfurization control device; and**

- CEM4 = Sulfur dioxide emissions, in tons per month, from Unit #1 and #13 that are emitted from the stack associated with Unit #13, measured by a continuous emission monitoring system specified in permit condition 8.4, and located downstream of the wet flue gas desulfurization control device.

The continuous emission monitoring systems shall calculate the sulfur dioxide emissions in accordance Equation 9-2, which is derived from the Acid Rain Program's Equation F-1 and F-3.

Equation 9-2

$$CEM = \frac{\sum_i^x (K) \times (Ch_i) \times (Qh_i) \times th_i}{2000}$$

Where:

- CEM = Sulfur dioxide emissions, in tons per month, emitted at the location of the specific continuous emission monitoring system;
- i = A specific hour in the month for the calculation to be calculated;
- x = The number of hours the unit actually operated during the month;
- K = 0.0000001660 pounds sulfur dioxide per standard cubic foot per parts per million;
- Ch = Hourly average sulfur dioxide concentration during unit operation, stack moisture basis, parts per million;
- Qh = Hourly average volumetric flow rate during unit operation, stack moisture basis, standard cubic feet per hour; and
- th = Unit operating time, hour or fraction of an hour (in equal increments that can range from one hundredth to one quarter of an hour, at the option of the owner or operator).

9.4 9.5 ~~Plantwide nitrogen~~ Nitrogen oxide limit. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air ~~greater than 16,448 tons of~~ nitrogen oxide ~~emissions in excess of the~~ per 12-month rolling period emission limit specified in Table 9.2 ~~from Unit #1, #2, #3, #4, #13, #14, #15, #25 and #33.~~ The plantwide 12-month rolling emission limits includes periods of startup, shutdown, and malfunction. The first month of the 12-month rolling total shall begin after initial startup of Unit #13.

Table 9-2 – Nitrogen Oxide Emission Limits

<u>Description</u>	<u>Emission Limit</u>
<u>Unit #1</u>	<u>15,104 tons per 12-month rolling period</u>
<u>Unit #13</u>	<u>1,314 tons per 12-month rolling period</u>

The ~~plantwide nitrogen oxide limit~~ allows Unit #13, #14, #15, #25 and #33 to ~~forgo a Prevention of Significant Deterioration review for nitrogen oxide.~~ Any relaxation in the permit that increases applicable emissions greater than ~~16,448~~ 15,104 tons of nitrogen oxide per 12-month rolling period for Unit #1 or 1,314 tons of nitrogen oxide per 12-month rolling period for Unit #13 or a violation of the ~~plantwide~~ nitrogen oxide limit(s) in Table 9-2 shall require a full prevention of

significant deterioration review for nitrogen oxide as though construction had not commenced on those sources.

~~The compliance demonstration for the plantwide limit shall be a summation of nitrogen oxide emissions released from Unit #1, #2, #3, #4, #13, #14, #15, #25 and #33. The nitrogen oxide emissions from Unit #1 and #13 shall be based on the continuous emission monitoring system associated with each unit. The nitrogen oxide emissions from Unit #2, #3, #4, #14, #15, #25 and #33 shall be based on the most recent stack performance test and the amount of fuel burned in each unit.~~

9.6 Nitrogen oxide monthly emission calculations. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall calculate nitrogen oxide emissions from Unit #1 and #13 each month as identified in Equations 9-3a and 9-3b, respectively.

Equation 9-3a – Unit #1

$$Unit\ #1_{NO_x} = (CEM\ 5) + (CEM\ 6)$$

Where:

- Unit #1_{NO_x} = Nitrogen oxide emissions, in tons per month, from Unit #1;
- CEM5 = Nitrogen oxide emissions, in tons per month, from Unit #1 emitted from the stack associated with Unit #1 and measured by a continuous emission monitoring system specified in permit condition 8.4; and
- CEM6 = Nitrogen oxide emissions, in tons per month, from Unit #1 that are measured by the continuous emission monitoring system specified in permit condition 8.4 and located upstream of the wet flue gas desulfurization control device.

Equation 9-3b – Unit #13

$$Unit\ #13_{NO_x} = (CEM\ 7)$$

Where:

- Unit #13_{NO_x} = Nitrogen oxide emissions, in tons per month, from Unit #13; and
- CEM7 = Nitrogen oxide emissions, in tons per month, from Unit #13 that are measured by the continuous emission monitoring system specified in permit condition 8.4 and located upstream of the wet flue gas desulfurization control device.

The continuous emission monitoring systems shall calculate the nitrogen oxide emissions in accordance equation 9-4, which is derived from the Acid Rain Program's Equations F-6, F-15, and F-18a.

Equation 9-4

$$CEM = \frac{\sum_{i=1}^X \left(\frac{(K) \times (Ch_i) \times (Fc) \times (100)}{CO2w} \right) \times \left(\frac{(Qw_i) \times (CO2w)}{(Fc) \times (100)} \right) \times th_i}{2000}$$

Where:

- CEM = The nitrogen oxide emissions emitted at the location of the specific continuous emission monitoring system;
- i = A specific hour in the month for the calculation to be calculated;
- x = The number of hours the unit actually operated during the month;
- K = 0.0000001194 pounds nitrogen oxide per standard cubic foot - parts per million;
- Ch = Hourly average nitrogen oxide concentration during unit operation, stack moisture basis, parts per million;
- Fc = Carbon based F-factor – 1,840 standard cubic feet per million Btus;
- CO2w = Percent carbon dioxide wet basis;
- Qw = Hourly average volumetric flow rate during unit operation, wet basis, standard cubic feet per hour; and
- th = Unit operating time, hour or fraction of an hour (in equal increments that can range from one hundredth to one quarter of an hour, at the option of the owner or operator).

9.6 9.8 Unit #1 operational limits. In accordance with ARSD 74:36:05:16.01(8), ~~on or after~~ before the initial startup of Unit #13, the owner or operator shall route the emissions from Unit #1 through the wet flue gas desulfurization system associated with Unit #13 at all times except during periods when the wet flue gas desulfurization system is not in operation due to malfunctions, repairs, preventative maintenance, or to conduct emissions testing to demonstrate compliance with the emission limits specific to Unit #13. Unit #1 may be operated when the wet flue gas desulfurization system is not in operation due to malfunctions, repairs, preventative maintenance, or to conduct emissions testing to demonstrate compliance with the emission limits specific to Unit #13 provided the owner or operator emits the exhaust gases from Unit #1 through the exhaust stack for Unit #1 and can demonstrate compliance with the ~~plantwide~~ sulfur dioxide limit for Unit #1 in permit condition 9.2.

9.9 Operational limit for Units #2, #3, and #4. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not operate Unit #2, #3, and #4 for more than 500 hours per 12-month rolling period for each unit. The first month of the 12-month rolling total shall begin the month of the initial startup of Unit #13.

9.10 Operational limit for Units #14, #15, #25 and #33. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall not operate Unit #14, #15, #25 and #33 for more than 500 hours per 12-month rolling period for each unit. The first month of the 12-month rolling total shall begin after a reasonable shakedown period. A reasonable shakedown period shall not exceed 180 days from the initial startup of Unit #13.

11.0 Hazardous Air Pollutant Emission Limits

11.1 Plantwide mercury emission limit. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air greater than 189 pounds of mercury per 12-

month rolling period from Unit #1 and #13. The plantwide limit includes periods of startup, shutdown, and malfunction. The first month of the 12-month rolling total shall begin three years from the month of commencing commercial operation of Unit #13. The compliance demonstration for the plantwide limit shall be based on the monitoring requirements in permit condition 11.6.

11.2 Unit #13 mercury emission limit. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #13 that contain mercury in excess of 0.000066 pounds per megawatt-hour gross energy output. Compliance with the mercury emission limit shall be based on a 12-month rolling average using the continuous emission monitoring system. The mercury limit applies at all times except during periods of startup, shutdown, or malfunction.

11.3 Unit #13 hydrogen fluoride emission limit. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #13 that contain hydrogen fluoride in excess of 2.17 pounds per hour. Compliance with the hydrogen fluoride emission limit is based on the stack testing requirements in Chapter 7.0.

11.4 Unit #13 hydrogen chloride emission limit. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #13 that contain hydrogen chloride in excess of 2.17 pounds per hour. Compliance with the hydrogen chloride emission limit is based on the stack testing requirements in Chapter 7.0.

11.5 Unit wide hazardous air pollutant limit for Unit #13. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit greater than or equal to 9.5 tons of a single hazardous air pollutant or 23.8 tons of a combination of hazardous air pollutants from ~~permitted units and fugitive sources~~ Unit #13 per 12-month rolling period. The 12-month rolling total shall begin on the initial startup of Unit #13. ~~The compliance demonstration for the Unit #13 limit shall be a summation of each hazardous air pollutant emission released from Unit #13. The mercury emissions from Unit #13 shall be based on the continuous emission monitoring system and the remaining hazardous air pollutant emissions shall be based on the most recent stack performance test, mass balance, emission factors, or other approved method of calculating hazardous air pollutant emissions.~~ The 12-month rolling total shall be calculated as identified in Equation 11-1.

Equation 11-1

$$E = \sum_{i=1}^{12} ME_i$$

Where:

- E = Hazardous air pollutant emissions, in tons per year, over a 12-month period; and
- ME = Hazardous air pollutant emissions, in tons per month, as calculated in permit condition 11.8.

11.6 Continuous mercury emission monitoring system. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall install, calibrate, maintain, and operate a continuous mercury emission monitoring system on the common stack for Unit #1 and #13. The owner or operator has the option of installing, calibrating, maintaining, and operating a continuous monitoring system on Unit #1 or parametric monitoring approved by the Secretary for time periods when the exhaust gas from Unit #1 is not passed through the common stack for Unit #1 and #13 as specified in permit condition 9.6. The continuous monitoring system is required to be installed and operational prior to or upon initial startup of Unit #13. The continuous monitoring system for mercury must be certified by the earlier of 90 unit operation days or 180 calendar days after the unit commences commercial operation. The continuous emission monitoring system shall measure and record the emissions at all times, including periods of startup, shutdown, malfunction or emergency conditions. Monitor downtime is allowed for system breakdowns, repairs, calibration checks, zero and span adjustments, and when Unit #13 is not in operation. The owner or operator shall submit the performance specification and quality assurance requirements for the system to the Secretary for approval prior to the initial startup of Unit #13.

11.7 Unit #13 coal analysis. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall obtain a weekly composite coal sample of the coal to be burned in Unit #13 and determine the fluoride content by weight and chloride content by weight.

11.8 Monthly hazardous air pollutant emission calculation. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall calculate the hazardous air pollutant emissions emitted each month as identified in equations 11-2, 11-3, 11-4, and 11-5.

Equation 11-2

$$ME = (M) + (HF) + (HCl) + (OH)$$

Where:

- ME = The hazardous air pollutant emissions in tons per year over a calendar month;
- M = The mercury emissions from Unit #13 in tons per year as determined by the continuous emission monitoring system as required in 11.6 for Unit #13;
- HF = The hydrogen fluoride emissions from Unit #13 in tons per year as determined by equation 11-3;
- HCl = The hydrogen chloride emissions from Unit #13 in tons per year as determined by equation 11-4; and
- OH = The total contribution for the other hazardous air pollutant emissions from Unit #13 in tons per year as determined by equation 11-5.

Equation 11-3

$$HF = \frac{(F) \times (CU) \times (1 - HFCE) \times (1.053)}{(1,000,000)}$$

Where:

- HF = The hydrogen fluoride emissions from Unit #13 in tons per year emitted during the month;

- F = The average fluoride content of the coal in parts per million by weight on a wet basis as determined by the coal analysis in condition 11.7. The average shall be based on a minimum of four “weekly composite samples”;
- CU = The amount of coal burned during the month in tons on a wet basis;
- HFCE = The control efficiency based on the most recent performance test as determined in permit condition 7.12 in its decimal form (e.g. 95% equates to 0.95). Until the initial performance test is completed, the control efficiency shall be 0.931;
- 1.053 = A conversion factor to convert fluoride to hydrogen fluoride; and
- 1,000,000 = A conversion factor to convert parts per million to a decimal form.

Equation 11-4

$$HCl = \frac{(Cl) \times (CU) \times (1 - HCICE) \times (1.028)}{(1,000,000)}$$

Where:

- HCl = The hydrogen chloride emissions from Unit #13 in tons per year emitted during the month;
- Cl = The average chloride content of the coal in parts per million by weight on a wet basis as determined by the coal analysis in condition 11.7. The average shall be based on a minimum of four “weekly composite samples”;
- CU = The amount of coal burned during the month in tons on a wet basis;
- HCICE = The control efficiency based on the most recent performance test as determined in permit condition 7.12 in its decimal form (e.g. 95% equates to 0.95). Until the initial performance test is completed, the control efficiency shall be 0.962;
- 1.028 = A conversion factor to convert chloride to hydrogen chloride; and
- 1,000,000 = A conversion factor to convert parts per million to a decimal form.

Equation 11-5

$$Other\ Haps = \frac{(122.7) \times (CHI)}{(2,000)}$$

Where:

- 122.7 = The emission factor in pounds per trillion Btus for the other identified hazardous air pollutants;
- CHI = The heat input provided from burning coal in Unit #13 as determined by the continuous emission monitoring system required in permit condition 8.4; and
- 2,000 = A conversion factor to convert pounds to tons.

11.8 11.9 Unit #13 case-by-case MACT exemption. The owner or operator is exempt from a case-by-case MACT determination for Unit #13. The exemption is based on the operational and hazardous air pollutant emission limits in this permit. Any relaxation in a permit condition that increases the hazardous air pollutant emissions equal to or greater than 9.5 tons per 12-month rolling period for a single hazardous air pollutant or 23.8 tons per 12-month rolling period for any combination of hazardous air pollutants shall require a case-by-case MACT determination as though construction had not commenced on Unit #13.

12.0 PSD New Source Performance Standards

12.1 New source performance standard for coal preparation plants. In accordance with ARSD 74:36:07:16, as referenced to 40 CFR §§ 60.250 through 60.254, the owner or operator shall comply with the particulate standards, monitoring, and testing requirements in the standards of performance for coal preparation plants. The specific emission limit from this new source performance standard for Unit #7, #17, #22, #26, #27 and #30 is a 20 percent opacity limit.

12.2 New source performance standard for stationary compression ignition internal combustion engines. In accordance with 40 CFR §§ 60.4200 through 60.4219, the owner or operator shall comply with all applicable standards and limitations, reporting, monitoring, recordkeeping, testing, and notification requirements in the standards of performance for stationary compression ignition internal combustion engines. The specific emission limits from this new source performance standard are as follows:

1. In accordance with 40 CFR §§ 60.4201(a) and 60.4202(d), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #14, #15, #25 and #33 that contain particulate matter in excess of 0.15 grams per horsepower hour;
2. In accordance with 40 CFR §§ 60.4201(a) and 60.4202(d), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #14, #15, #25 and #33 that contain carbon monoxide in excess of 2.6 grams per horsepower hour;
3. In accordance with 40 CFR § 60.4201(a), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #15 that contain nitrogen oxide and non-methane organic compounds in excess of 4.8 grams per horsepower hour; and
4. In accordance with 40 CFR § 60.4202(d), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #14, #25 and #33 that contain nitrogen oxide and non-methane organic compounds in excess of 3.0 grams per horsepower hour.

12.3 New source performance standard for Unit #13. In accordance with ARSD 74:36:07:03, as referenced to 40 CFR §§ 60.40Da through 60.51Da, the owner or operator shall comply with all applicable standards and limitations, reporting, monitoring, recordkeeping, testing, and notification requirements in the standards of performance for electric utility steam generating units for which construction is commenced after September 18, 1978. The specific emission limits from this new source performance standard are as follows:

1. In accordance with 40 CFR § 60.42Da(b), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #13 which exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity. The opacity standard applies at all times except during periods of startup, shutdown, or malfunction. This provision does not apply when the presence of uncombined water is the only reason for failure to meet the requirement;

2. In accordance with 40 CFR § 60.42Da(c), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #13 that contain particulate matter in excess of 0.14 pounds per megawatt hour gross energy output or 0.015 pounds per million Btu. The particulate standard applies at all times except during periods of startup, shutdown, or malfunction;
3. In accordance with 40 CFR §§ 60.43Da(a) and 60.43Da(i), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #13 that contain sulfur dioxide in excess of the emission limit specified in Table 12-1.

Table 12-1 – Sulfur Dioxide Emission Limit

<u>Unit</u>	<u>Description</u>	<u>Sulfur Dioxide Emission Limit ¹</u>
<u>#13</u>	<u>Super-critical pulverized coal fired boiler</u>	<u>1.4 pounds per megawatt-hour gross energy output, or 5 percent of the potential combustion concentration (95 percent reduction)</u>

¹ – Compliance with the sulfur dioxide limit and percent reduction are based on a 30-day rolling average.

The sulfur dioxide emission standards apply at all times except during periods of startup, shutdown, or when both emergency conditions exist and the procedures defined in the new source performance standard are implemented; and

4. In accordance with 40 CFR §§ 60.44Da(a) and 60.44Da(e)(1), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #13 that contain nitrogen oxide in excess of 1.0 pound per megawatt-hour gross energy output. Compliance with the nitrogen oxide limit is based on a 30-day rolling average. The nitrogen oxide emission standard applies at all times except during periods of startup, shutdown, or malfunction.

12.4 New source performance standard for nonmetallic mineral process plants. In accordance with ARSD 74:36:07:27, as referenced to 40 CFR §§ 60.670 through 60.676, the owner or operator shall comply with all applicable standards and limitations, reporting, monitoring, recordkeeping, testing, and notification requirements in the standards of performance for nonmetallic mineral processing plants. The specific emission limits from this new source performance standard are as follows:

1. In accordance with 40 CFR § 60.672(a)(1), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #20, #21, #24 and #29, that contain particulate matter in excess of 0.022 grains per dry standard cubic foot; and
2. In accordance with 40 CFR §§ 60.672(a)(2) and 60.672(f), the owner or operator shall not cause to be discharged into the atmosphere gases from Unit #20, #21, #24 and #29, that exhibit greater than 7 percent opacity.

13.0 PSD General Requirements

13.1 Construction and operation of source. In accordance with Administrative Rules of South Dakota (ARSD) 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall construct and operate the units, controls, and processes as described in Table 13-1 in accordance with the statements, representations, and supporting data contained in the complete permit application submitted and dated July 20, 2005, and June 20, 2006, unless modified by the conditions of this permit. The application consists of the application forms, updates, supporting data, and supplementary correspondence. If the owner or operator becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in an application, such information shall be promptly submitted. The control equipment shall be operated in a manner that achieves compliance with the conditions of this permit at all times.

Table 13-1 – Description of Permitted Units, Operations, and Processes

<u>Unit</u>	<u>Description</u>	<u>Operating Rate</u>	<u>Control Device</u>
<u>#7a</u>	<u>Rotary car dumper building</u>	<u>3,600 tons per hour¹</u>	<u>Baghouse</u>
<u>#7b</u>			<u>Baghouse</u>
<u>#7c</u>			<u>Baghouse</u>
<u>#7d</u>			<u>Baghouse</u>
<u>#13</u>	<u>Super-critical pulverized coal fired boiler fired on subbituminous coal, ultra low sulfur diesel, or biodiesel. The super-critical pulverized coal fired boiler will be equipped with low NOx burners.</u>	<u>6,000 million Btus per hour heat input¹</u>	<u>Baghouse, wet flue gas desulfurization and selective catalytic reduction</u>
<u>#14</u>	<u>Fire pump fired on ultra low sulfur diesel and biodiesel</u>	<u>420 horsepower¹</u>	<u>Catalyzed diesel particulate filter</u>
<u>#15</u>	<u>Generator fired on ultra low sulfur diesel and biodiesel</u>	<u>2,220 kilowatts¹</u>	<u>Catalyzed diesel particulate filter</u>
<u>#16</u>	<u>Industrial cooling tower with 18 cells</u>	<u>312,540 gallons per minute¹</u>	<u>Drift eliminators</u>
<u>#17</u>	<u>Coal reclaim system</u>	<u>380 tons per hour²</u>	<u>Baghouse</u>
<u>#20</u>	<u>Limestone reclaim conveyor</u>	<u>11 tons per hour²</u>	<u>Baghouse</u>
<u>#21</u>	<u>Limestone receiving system</u>	<u>11 tons per hour²</u>	<u>Baghouse</u>
<u>#22</u>	<u>Plant coal transfer and silo fill system</u>	<u>380 tons per hour²</u>	<u>Baghouse</u>
<u>#23</u>	<u>Fly ash silo bin vent</u>	<u>28 tons per hour²</u>	<u>Baghouse</u>
<u>#24</u>	<u>Limestone day bin vent #1</u>	<u>11 tons per hour²</u>	<u>Baghouse</u>
<u>#25</u>	<u>Booster pump (boiler) fired on ultra low sulfur diesel and biodiesel</u>	<u>225 horsepower¹</u>	<u>Catalyzed diesel particulate filter</u>
<u>#26</u>	<u>Coal plant transfer system</u>	<u>380 tons per hour²</u>	<u>Baghouse</u>

<u>Unit</u>	<u>Description</u>	<u>Operating Rate</u>	<u>Control Device</u>
<u>#27</u>	<u>Coal crusher house</u>	<u>380 tons per hour</u> ²	<u>Baghouse</u>
<u>#29</u>	<u>Limestone pre-crusher building</u>	<u>200 tons per hour</u> ¹	<u>Baghouse</u>
<u>#30</u>	<u>Coal stack out system</u>	<u>380 tons per hour</u> ²	<u>Baghouse</u>
<u>#33</u>	<u>Booster pump (coal area) fired on ultra low sulfur diesel and biodiesel</u>	<u>225 horsepower</u> ¹	<u>Catalyzed diesel particulate filter</u>
<u>#34</u>	<u>Pretreatment soda ash bin vent</u>	<u>20 tons per hour</u> ¹	<u>Baghouse</u>
<u>#35</u>	<u>Pretreatment lime bin vent</u>	<u>20 tons per hour</u> ¹	<u>Baghouse</u>

¹ – The operating rate is the nominal or manufacturer listed operating rate noted in the PSD application and are descriptive only; and

² – The operating rates are the annual average rates of the equipment or system noted in the PSD application and is descriptive only.

13.2 Final design changes. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator is authorized to construct and operate the units, controls, and processes as described in Table 13-1 that differ from the design described in the application without obtaining approval from the Secretary provided the final design does not significantly differ from those described in the application and the final design would still demonstrate compliance with the National Ambient Air Quality Standards and PSD Increments. The term “final design does not significantly differ” is limited to the physical parameters of the units, controls, and processes such as the stack locations, stack heights, stack diameters, etc. The term does not include changes to emission limits, operational limits, recordkeeping requirements, reporting requirements, performance testing requirements, etc. The owner or operator shall notify the Secretary of any such changes and submit documentation that demonstrates compliance with the National Ambient Air Quality Standards and PSD Increments within 60 days of initial startup.

13.3 Commence construction. In accordance with ARSD 74:36:09:02, as referenced to 40 CFR § 52.21(r)(2), the owner or operator shall commence construction within 18 months of the effective date of permit #28.0803-PSD. If construction is delayed or interrupted for a period of 18 months or more, permit #28.0803-PSD becomes invalid. The owner or operator may apply, before the end of the 18-month period, to the Secretary for an extension. The Secretary may grant an extension after the owner or operator satisfactorily demonstrates that an extension is justified.

13.4 Submit operating permit application. In accordance with ARSD 74:36:05:03.01, the owner or operator shall submit a complete permit application to revise permit #28.0801-29 within 12 months after commencing operation of the pulverized coal fired boiler (Unit #13). For the purpose of this condition, commencing operation means the initial startup of the boiler, which is the first date that the boiler was operated when firing pulverized coal. A complete permit application shall include all of the requirements specified in ARSD 74:36:05:12, including periodic monitoring and compliance assurance monitoring activities necessary to assure compliance.

13.5 Submit acid rain permit application. In accordance with ARSD 74:36:16:01, the owner or operator shall submit a complete Acid Rain permit application 24 months prior to the initial startup of the pulverized coal fired boiler (Unit #13).

13.6 Construction date notification. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(9), the owner or operator shall notify the Secretary of the date construction commenced on the permanent structures for the pulverized coal fired boiler system (Unit #13). The notification shall be postmarked within 15 days after the date construction commenced.

13.7 Initial startup notification. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(9), the owner or operator shall notify the Secretary of the initial startup date of the pulverized coal fired boiler (Unit #13). The notification shall be postmarked within 15 days after the date of initial startup.

13.8 Coal handling operational limits. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall limit the operation of Unit #7 and #30 to 18 hours per day for each unit and 5,000 hours per 12-month rolling period for each unit. The first month of the 12-month rolling total shall begin after a reasonable shakedown period. A reasonable shakedown period shall not exceed 180 days from the initial startup of Unit #13.

13.9 Acid rain requirements for Unit #13. In accordance with ARSD 74:36:16, the owner or operator shall comply with all applicable standards and limitations, reporting, monitoring, recordkeeping, testing, and notification requirements of the Acid Rain program for Unit #13.

13.10 Initial performance test for Unit #13. In accordance with ARSD 74:36:11:02, the owner or operator shall conduct an initial performance test on Unit #13. The initial performance test shall be conducted to determine emission rates of opacity, particulate matter 10 microns in diameter or less (filterable and condensable), total suspended particulate matter (filterable and condensable), sulfur dioxide, nitrogen oxide, volatile organic compounds as carbon, carbon monoxide, sulfuric acid mist, and fluoride. The initial performance test shall be conducted within 180 days after initial startup of Unit #13.

The owner or operator shall conduct two additional performance tests on Units #13. The two tests shall be conducted to determine emission rates of particulate matter 10 microns in diameter or less (filterable and condensable) and total suspended particulate matter (filterable and condensable). The second test shall be completed within 60 to 180 days after the initial test. The third test shall be completed within 60 to 180 days after the second test.

The owner or operator shall conduct an annual performance test on Unit #13 for particulate matter 10 microns in diameter or less (filterable and condensable), total suspended particulate matter (filterable and condensable), volatile organic compounds as

carbon, sulfur acid mist, and fluoride during each calendar year starting with the calendar year after the initial performance tests were completed. Each subsequent performance test shall not be conducted within 180 days after the previous performance test.

13.11 Initial performance test for Unit #14, #15, #25 and #33. In accordance with ARSD 74:36:11:02, the owner or operator shall conduct an initial performance test on Unit #14, #15, #25 and #33. The initial performance tests shall be conducted to determine emission rates of opacity, particulate matter 10 microns in diameter or less (filterable), nitrogen oxide, volatile organic compounds as carbon, and carbon monoxide. The initial performance test shall be conducted within 180 days after initial startup of Unit #13.

The owner or operator shall conduct an additional performance tests on Unit #14, #15, #25, and #33 for opacity, particulate matter 10 microns in diameter or less (filterable), nitrogen oxide, volatile organic compounds as carbon, and carbon monoxide every fifth calendar year after the initial performance test is completed.

13.12 Initial performance test for other units. In accordance with ARSD 74:36:11:02, the owner or operator shall conduct an initial performance test on the following units:

1. Unit #7a, #7b, #7c, or #7d;
2. Unit #17, #26, or #30;
3. Unit #20 or #21;
4. Unit #22;
5. Unit #23;
6. Unit #24 or #29;
7. Unit #27; and
8. Unit #34 or #35.

The performance tests shall be conducted to determine emission rates of particulate matter 10 microns in diameter or less (filterable). The owner or operator shall conduct the performance tests within 180 days of initial startup of the pulverized coal fired boiler (Unit #13).

The owner or operator shall conduct an additional performance tests for particulate matter 10 microns in diameter or less (filterable) every fifth calendar year after the initial performance test is completed.

13.13 Initial certification of continuous emission monitoring system. In accordance with ARSD 74:36:16:04 and ARSD 74:36:19:15, the owner or operator shall conduct the initial certification of each continuous emission monitoring system required in permit condition 13.14 within 180 days of initial startup of Unit #13.

13.14 Continuous emission monitoring systems. In accordance with ARSD 74:36:07, ARSD 74:36:09, ARSD 74:36:13, and ARSD 74:36:16, the owner or operator shall install, calibrate, maintain, and operate continuous emission monitoring systems for opacity,

carbon dioxide, sulfur dioxide, nitrogen oxide, flue gas flow, and carbon monoxide on Unit #13. The continuous emission monitoring systems shall measure and record the emissions at all times, including periods of startup, shutdown, malfunctions or emergency conditions. Monitor downtime is allowed for system breakdowns, repairs, calibration checks, zero and span adjustments, and when Unit #13 is not in operation.

13.15 Performance specifications and quality assurance. In accordance with ARSD 74:36:07, ARSD 74:36:09, ARSD 74:36:13, and ARSD 74:36:16, the continuous emission monitoring systems on Unit #13 shall meet the performance specifications in 40 CFR Part 60, Appendix B and the quality assurance requirements in 40 CFR Part 60, Appendix F; or the performance specifications in 40 CFR Part 75, Appendix A and the quality assurance requirements in 40 CFR Part 75, Appendix B.

13.16 State opacity limit. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:12:01, the owner or operator may not discharge into the ambient air an air contaminant of a density equal to or greater than that designated as 20 percent opacity from any permitted unit, operation, or process listed in Table 1-1. This provision does not apply when the presence of uncombined water is the only reason for failure to meet the requirement. An exceedance of the opacity limit is not considered a violation during brief periods of soot blowing, start-up, shutdown, or malfunction. Malfunction means any sudden and unavoidable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. A failure caused entirely or in part by poor maintenance, careless operation, preventable equipment breakdown, or any other cause within the control of the owner or operator of the source is not a malfunction and is considered a violation.

14.0 PSD BEST AVAILABLE CONTROL TECHNOLOGY (BACT) LIMITS

14.1 BACT limits for particulate matter. In accordance with ARSD 74:36:09:02, as referenced to 40 CFR § 52.21(j)(3), the owner or operator shall not allow the emissions of particulate matter 10 microns in diameter or less (PM10) in excess of the emission limits specified in Table 14-1 for the appropriate permitted unit, operation, and process. Compliance with the PM10 BACT emission limits in Table 14-1 for Unit #13, #14, #15, #25, and #33 during periods of startup, shutdown, and malfunction shall be based on permit condition 14.8.

Table 14-1 – PM10 BACT Emission Limits

<u>Unit</u>	<u>Description</u>	<u>PM10 Emission Limit</u>
<u>#7a</u>	<u>Rotary car dumper building</u>	<u>0.005 grains/standard cubic foot (filterable); and 1.2 pounds per hour (filterable) ¹</u>
<u>#7b</u>		<u>0.005 grains/standard cubic foot (filterable); and 1.2 pounds per hour (filterable) ¹</u>
<u>#7c</u>		<u>0.005 grains/standard cubic foot (filterable); and 1.2 pounds per hour (filterable) ¹</u>
<u>#7d</u>		<u>0.005 grains/standard cubic foot (filterable); and 1.2 pounds per hour (filterable) ¹</u>
<u>#13</u>	<u>Super-critical pulverized coal fired boiler</u>	<u>72 pounds/hour (filterable) ¹; 0.012 pounds/million Btu (filterable) ¹; and 0.03 pounds/million Btu (filterable and condensable) ^{1, 2}</u>
<u>#14</u>	<u>Fire pump</u>	<u>New Source Performance Standard – see permit condition 5.7; and 0.1 pounds per hour (filterable) ¹</u>
<u>#15</u>	<u>Generator</u>	<u>New Source Performance Standard – see permit condition 5.7; and 0.7 pounds per hour (filterable) ¹</u>
<u>#17</u>	<u>Emergency reclaim hopper</u>	<u>0.005 grains/standard cubic foot (filterable); and 0.35 pounds per hour (filterable) ¹</u>
<u>#20</u>	<u>Limestone reclaim hopper</u>	<u>0.01 grains/standard cubic foot (filterable); and 0.6 pounds per hour (filterable) ¹</u>
<u>#21</u>	<u>Limestone receiving hopper</u>	<u>0.01 grains/standard cubic foot (filterable); and 0.5 pounds per hour (filterable) ¹</u>
<u>#22</u>	<u>Plant transfer/silo fill system</u>	<u>0.005 grains/standard cubic foot (filterable); and 1.6 pounds per hour (filterable) ¹</u>
<u>#23a</u>	<u>Fly ash silo bin vent</u>	<u>0.01 grains/standard cubic foot (filterable); and 0.9 pounds per hour (filterable) ¹</u>
<u>#23b</u>		<u>0.01 grains/standard cubic foot (filterable); and 0.9 pounds per hour (filterable) ¹</u>
<u>#24</u>	<u>Limestone day bin vent #1</u>	<u>0.01 grains/standard cubic foot (filterable); and 0.3 pounds per hour (filterable) ¹</u>
<u>#25</u>	<u>Booster pump (boiler)</u>	<u>New Source Performance Standard – see permit condition 5.7; and 0.1 pounds per hour (filterable) ¹</u>
<u>#26</u>	<u>Transfer conveyor</u>	<u>0.005 grains/standard cubic foot (filterable); and 0.2 pounds per hour (filterable) ¹</u>
<u>#27</u>	<u>Coal crusher house</u>	<u>0.005 grains/standard cubic foot (filterable); and 0.8 pounds per hour (filterable) ¹</u>
<u>#29</u>	<u>Limestone pre-crusher building</u>	<u>0.01 grains/standard cubic foot (filterable); and 0.2 pounds per hour (filterable) ¹</u>
<u>#30</u>	<u>Coal stack out system</u>	<u>0.005 grains/standard cubic foot (filterable); and 0.3 pounds per hour (filterable) ¹</u>
<u>#33</u>	<u>Booster pump (coal area)</u>	<u>New Source Performance Standard – see permit condition 5.7; and 0.1 pounds per hour (filterable) ¹</u>

<u>Unit</u>	<u>Description</u>	<u>PM10 Emission Limit</u>
<u>#34</u>	<u>Pretreatment soda ash bin vent</u>	<u>0.01 grains/standard cubic foot (filterable); and 0.1 pounds per hour (filterable) ¹</u>
<u>#35</u>	<u>Pretreatment lime bin vent</u>	<u>0.01 grains/standard cubic foot (filterable); and 0.1 pounds per hour (filterable) ¹</u>

¹ – Compliance with the emission limit is based on the average of three test runs; and

² – If the testing per permit condition 13.10 demonstrates an emission rate less than 0.03 pounds per million Btus (filterable and condensable), the emission limit shall be lowered to the average of the three tests (nine test runs) plus two standard deviations or 0.018 pounds per million Btus, whichever is greater. In no case shall the limit be greater than 0.03 pounds per million Btus (filterable and condensable).

14.2 BACT limits for carbon monoxide. In accordance with ARSD 74:36:09:02, as referenced to 40 CFR § 52.21(j)(3), the owner or operator shall not allow the emissions of carbon monoxide in excess of the emission limits specified in Table 14-2 for the appropriate permitted unit, operation, and process. Compliance with the carbon monoxide BACT emission limits in Table 14-2 for #14, #15, #25, and #33 during periods of startup, shutdown, and malfunction shall be based on permit condition 14.8.

Table 14-2 – Carbon Monoxide BACT Emission Limits

<u>Unit</u>	<u>Description</u>	<u>Carbon Monoxide Emission Limit</u>
<u>#13</u>	<u>Super-critical pulverized coal fired boiler</u>	<u>900 pounds/hour ¹ and 0.15 pounds/million Btu ¹</u>
<u>#14</u>	<u>Fire pump</u>	<u>New Source Performance Standard – see permit condition 12.2 ²</u>
<u>#15</u>	<u>Generator</u>	<u>New Source Performance Standard – see permit condition 12.2 ²</u>
<u>#25</u>	<u>Booster pump (boiler)</u>	<u>New Source Performance Standard – see permit condition 12.2 ²</u>
<u>#33</u>	<u>Booster pump (coal area)</u>	<u>New Source Performance Standard – see permit condition 12.2 ²</u>

¹ – Compliance with the emission limit is based on a 30-day rolling average; and

² – Compliance with the emission limit is based on the average of three test runs.

14.3 BACT limits for volatile organic compounds as carbon. In accordance with ARSD 74:36:09:02, as referenced to 40 CFR § 52.21(j)(3), the owner or operator shall not allow the emissions of volatile organic compounds (VOCs) as carbon in excess of the emission limits specified in Table 14-3 for the appropriate permitted unit, operation, and process. Compliance with the volatile organic compound as carbon BACT emission limits in Table 14-3 during periods of startup, shutdown, and malfunction shall be based on permit condition 14.8.

Table 14-3 – Volatile Organic Compound as Carbon BACT Emission Limits

<u>Unit</u>	<u>Description</u>	<u>VOC as Carbon Emission Limit ¹</u>
<u>#13</u>	<u>Super-critical pulverized coal fired boiler</u>	<u>0.0036 pounds/million Btu</u>
<u>#14</u>	<u>Fire pump</u>	<u>New Source Performance Standard – see permit condition 12.2</u>
<u>#15</u>	<u>Generator</u>	<u>New Source Performance Standard – see permit condition 12.2</u>
<u>#25</u>	<u>Booster pump (boiler)</u>	<u>New Source Performance Standard – see permit condition 12.2</u>
<u>#33</u>	<u>Booster pump (coal area)</u>	<u>New Source Performance Standard – see permit condition 12.2</u>

¹ – Compliance with the emission limit is based on the average of three test runs.

14.4 BACT limit for sulfuric acid mist. In accordance with ARSD 74:36:09:02, as referenced to 40 CFR § 52.21(j)(3), the owner or operator shall not allow the emissions of sulfuric acid mist in excess of the emission limits specified in Table 14-4 for the appropriate permitted unit, operation, and process. Compliance with the sulfuric acid mist BACT emission limits in Table 14-4 during periods of startup, shutdown, and malfunction shall be based on permit condition 14.8.

Table 14-4 – Sulfuric Acid Mist BACT Emission Limit

<u>Unit</u>	<u>Description</u>	<u>Sulfuric Acid Mist Emission Limit ¹</u>
<u>#13</u>	<u>Super-critical pulverized coal fired boiler</u>	<u>0.005 pounds/million Btu</u>

¹ – Compliance with the emission limit is based on the average of three test runs.

14.5 BACT limit for fluoride. In accordance with ARSD 74:36:09:02, as referenced to 40 CFR § 52.21(j)(3), the owner or operator shall not allow the emissions of fluoride in excess of the emission limits specified in Table 14-5 for the appropriate permitted unit, operation, and process. Compliance with the fluoride BACT emission limits in Table 14-5 during periods of startup, shutdown, and malfunction shall be based on permit condition 14.8.

Table 14-5 – Fluoride BACT Emission Limit

<u>Unit</u>	<u>Description</u>	<u>Fluoride Emission Limit ¹</u>
<u>#13</u>	<u>Super-critical pulverized coal fired boiler</u>	<u>0.0006 pounds/million Btu</u>

¹ – Compliance with the emission limit is based on the average of three test runs.

14.6 Paved roads and parking lots. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall pave all haul roads and parking lots within Otter Tail Power Company’s property boundaries at this location.

14.7 Cooling tower. In accordance with ARSD 74:36:09:02, as referenced to ARSD

74:36:05:16.01(8), the owner or operator shall install 0.0005 percent efficient drift eliminators on Unit #16.

14.8 Compliance with BACT limits during startup, shutdown, and malfunction. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall utilize good work and maintenance practices and manufacturers' recommendations to minimize emissions during, and the frequency and duration of, startup, shutdown, and malfunction events for Unit #13, #14, #15, #25 and #33. The owner or operator shall develop and implement a startup, shutdown, and malfunction plan for Unit #13, #14, #15, #25 and #33. The startup, shutdown, and malfunction plan shall describe, in detail, procedures for operating and maintaining Unit #13, #14, #15, #25 and #33 during periods of startup, shutdown, and malfunction; a program of corrective action for malfunctions; and record keeping requirements identifying that the procedures and corrective actions were completed. The startup, shutdown, and malfunction plan shall be submitted to and approved by the Secretary at least 90 days prior to the initial startup of Unit #13. This permit condition is not applicable to Unit #13 for carbon monoxide.

15.0 PSD FUGITIVE DUST CONTROLS

15.1 Paved road and parking area controls. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall use a mechanical sweeper that collects particulate and is equipped with wet suppression, use a vacuum sweeper, or water flush all paved roads and parking areas during spring, summer and fall. During winter months or during freezing weather, the paved roads and parking lots shall be cleaned with the mechanical sweeper that collects particulate and is equipped with wet suppression or a vacuum sweeper. An alternative method may be approved by the Secretary if the owner or operator provides documentation that the alternative method is equivalent to the methods specified in this permit condition in controlling fugitive dust emissions. The frequency of cleaning will be on an as needed basis to comply with the opacity limit in permit condition 15.4.

15.2 Open storage pile control. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall sample and analyze the silt content of open storage piles that have a height greater than or equal to three feet and have a total surface area greater than or equal to 150 square feet. The silt content analysis shall be conducted once per calendar year and in accordance with ASTM C-136 or another equivalent method approved by the Secretary. Silt is defined as any material with a particulate size less than 74 micrometers in diameter and passes through a number 200 sieve. The owner or operator shall implement one of the following control measures for each open storage pile that has a silt content of four percent by weight or greater:

1. Apply chemical stabilizer to the surface area of the open storage pile in a sufficient quantity and frequency to comply with the opacity limit in permit condition 15.4;
2. Apply water to the surface area of the open storage pile on an as needed basis to comply

with the opacity limit in permit condition 15.4;

3. Install at least a two-sided enclosure with walls, which extend, at a minimum, to the top of the open storage pile and complies with the opacity limit in permit condition 15.4; or
4. An alternative method that the owner or operator has demonstrated can comply with the opacity limit in permit condition 15.4 and is approved by the Secretary.

15.3 Waste pit controls. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall control fugitive dust emissions from a waste pit. A waste pit means an area where particulate matter from the process equipment or pollution control devices is deposited for storage or disposal and the disposal area unit(s) has not been closed. The owner or operator shall implement one of the following control measures for waste pits:

1. Apply a soil cement or similar application that is approved by the Secretary over the entire waste pit area;
2. Apply water spray to adequately create a crusted surface over the entire waste pit area; or
3. Implement a combination of wind protection (wind-fence, wind-screen, three wall enclosures) and soil cement or water spray applications.

Waste pit controls shall be applied or constructed in a manner that maintains compliance with the opacity limit in permit condition 15.4.

15.4 Opacity limit for fugitive sources. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(8), the owner or operator shall not discharge a visible emission to the ambient air of a density equal to or greater than 20 percent opacity from a paved road or parking lot, open storage pile, track out area, or waste pit. The 20 percent opacity reading is based on a series of two minute averages with a minimum observation period of six minutes. The opacity reading shall be determined by 40 CFR Part 60, Appendix A, Method 9.

If an operation exceeds the opacity limit, the Secretary will allow the owner or operator two opportunities to correct the exceedance with existing controls and/or control measures. In the event of a third exceedance from the same operation, the Secretary will notify the owner or operator that the Best Available Control Measure (BACM) for that operation must be reevaluated. The owner or operator shall reevaluate BACM for that operation and submit a written proposal to the Secretary on the proposed new BACM for the operation within 60 days of receiving the Secretary's notification. The Secretary shall approve or disapprove the proposed new BACM within 60 days of receiving the proposal from the owner or operator.

15.5 Record keeping requirements for fugitive sources. In accordance with ARSD 74:36:09:02, as referenced to ARSD 74:36:05:16.01(9), the owner or operator shall develop, maintain, and implement a fugitive dust plan. The fugitive dust plan shall be maintained on-site and shall contain the following items:

1. The specific work practice standards that will be implemented as required in permit conditions 15.1, 15.2, and 15.3;
2. The frequency the opacity readings required in permit conditions 15.4 will be conducted; and
3. Documentation that the work practice standards were implemented and a copy of each opacity reading.

16.0 MONITORING PLAN

16.1 Operation, maintenance, and monitoring plan. In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall develop, maintain, and implement a written Operation, Maintenance, and Monitoring plan. The Operation, Maintenance, and Monitoring plan shall be submitted to the Secretary with the application required in permit condition 13.4. Any subsequent changes to the plan must be submitted to the Secretary for review and approval. Pending approval by the Secretary of an initial or amended plan, the owner or operator must comply with the provisions of the submitted plan. Each plan must contain the following information:

1. Process and control device parameters to be monitored to determine compliance, along with established operating limits or ranges, as applicable, for each emission unit;
2. A monitoring schedule for each emission unit;
3. Procedures for the proper operation and maintenance of each emission unit and each air pollution control device used to meet the applicable emission limits and operating limits in this permit;
4. Procedures for the proper installation, operation, and maintenance of monitoring devices or systems used to determine compliance include:
 - a. Calibration and certification of accuracy of each monitoring device;
 - b. Performance and equipment specifications for the sample interface, parametric signal analyzer, and the data collection and reduction systems; and
 - c. Ongoing operation and maintenance procedures in accordance with the following requirements:
 - i. Maintain and operate each continuous monitoring system in a manner consistent with good air pollution control practices;
 - ii. Maintain and operate each continuous monitoring system as specified in this permit;
 - iii. Maintain the necessary parts for routine repairs of each continuous monitoring system;
 - iv. Install, operate, and the data verified prior to or in conjunction with conducting performance tests. The verification shall, at a minimum, include completion of the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system; and
 - v. Except for system breakdowns, out-of-control periods, repairs, maintenance periods, calibration checks, and zero (low-level) and high-level calibration drift adjustments, all continuous monitoring systems shall be in continuous

operation.

5. Procedures for monitoring process and control device parameters.
6. Corrective actions to be taken when process or operating parameters or add-on control device parameters deviate from the operating limits specified in this permit, including:
 - a. Procedures to determine and record the cause of a deviation or excursion, and the time the deviation or excursion began and ended; and
 - b. Procedures for recording the corrective action taken, the time corrective action was initiated, and the time and date the corrective action was completed; and
7. A maintenance schedule for each emission unit and control device that is consistent with the manufacturer's instructions and recommendations for routine and long-term maintenance.